Ontario

Ministry
of the
Environment

M.O.E.
CLASS ENVIRONMENTAL ASSESSMENT DOCUMENT

Expansion or Upgrading of an Existing Sewage or Water System

June 1986

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THE ENVIRONMENTAL ASSESSMENT ACT, 1975

SUMMARY FORM FOR AN ENVIRONMENTAL ASSESSMENT SUBMISSION

Re: An Environmental Assessment Class Document received from the Ministry of the Environment.

Expansions or Upgradings to Existing Sewage and Water Systems, to cover projects of this classification anywhere in the province implemented by the Ontario Ministry of the Environment.

Environmental Assessment Number _____

SUMMARY

This document deals with a class of projects where the capacity of an existing sewage or water system is increased through an expansion project, or the level or quality of system performance is improved through an upgrading project. This document is a commitment by the Ministry to accept responsibility for the development and implementation of measures designed to mitigate the negative environmental condition changes associated with this type of project. This document has three primary purposes, namely:

1. To serve as a guideline for Ministry of the Environment personnel in the implementation of programs to expand or upgrade sewage and water systems in accordance with the Environmental Assessment Act, 1975.

2. To serve as a statement for public use of the decision-making process of the Ministry in the development and implementation of an undertaking.

3. To serve as a description of Ministry activities and public commitment for the Environmental Assessment Branch of the Ministry of the Environment for its administration of the Environmental Assessment Act.

For each Schedule C project undertaken in this Class an Environmental Study Report will be written, covering the headings discussed in the following text.

1. Purpose of this Class of Undertaking

The projects in this Class are undertaken to resolve problems affecting the operation and efficiency of existing sewage and water systems and/or to accommodate future growth of communities. A specific project may be designed to achieve one or more of the following objectives:

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(i) to reduce public health problems or nuisances
(ii) to improve the quality of the water
(iii) to improve the disposal of treatment wastes
(iv) to expand the capacity of the system
(v) to prevent system failure
(vi) to accommodate design improvements or new technology

2. Description of the Undertaking

This Environmental Assessment document will apply to specific projects which involve one or more of the following changes to existing water systems:

1. expansion or upgrading of water source facilities
2. expansion or upgrading of water treatment facilities
3. expansion or upgrading of water distribution facilities
4. expansion or upgrading of sewage collection facilities
5. expansion or upgrading of sewage treatment facilities
6. expansion or upgrading of sludge management procedures

Most projects in this Class will alter the physical characteristics of the respective sewage or water systems by requiring:

a) extension of existing easements for water mains or sewers
b) construction of new buildings/structures or additions to existing buildings/structures
c) acquisition of additional land to house the facilities, either at existing sites or new locations
d) acquisition of additional land to maintain appropriate buffer zones between adjacent uses and treatment facilities

It is anticipated that the majority of projects will have few, if any, significant environmental condition changes since the existing sewage or water system has been established and maintained for some time. In the event that a given project has potentially severe environmental impacts, controversial social or financial implications, or the project's history, initial research, or public involvement suggest particularly sensitive or controversial implications may be expected, or available remedial measures will be inadequate to resolve expressed concerns, the Ministry of the Environment will notify the Environmental Assessment Branch of its intention to carry out an individual Environmental Assessment for that project.

3. Justification of the Need for the Undertaking

The justification or the rightness of the need as previously expressed in (1), is related to the mandate of the Ministry to protect and enhance the natural environment and to the Ministry's goal of ensuring sound management of waste and water resources across the province. Problems may develop in the operation of existing sewage or water systems, demands for servicing may increase as a result of community growth, or changes in policy may require improvements in the quality of water or sludge. Typical problems or needs which would be solved through expansion and/or upgrading projects are described in Parts 2.1.2 and 2.2.2. of the document.

4. Description of Possible Alternatives to the Undertaking

Depending on the nature of the existing sewage or water system and of the problems being encountered or forecasted, any one of the large number of alternative solutions may be appropriate. The alternatives considered must be reasonable, effective, and feasible in terms of engineering and environmental requirements and costs.

Alternative solutions other than expansion or upgrading of existing water systems are grouped below in six categories:

1. Modify operational practices at the water purification plant
2. Expand the maintenance program
3. Reduce water demand
4. Obtain water from another source
5. Limit community growth
6. Do Nothing

There are nine major alternatives to the expansion or upgrading of an existing sewage system:

1. Modify operational practices at the treatment facility
2. Expand the maintenance program
3. Improve individual septic systems
4. Reduce sewage flows
5. Reduce industrial discharge
6. Improve community stormwater management
7. Limit community growth
8. Discharge to an adjacent existing sewage system
9. Do nothing

5. Alternative Implementation Methods for Both the Undertaking and Alternatives To It

Once it is determined that an expansion and/or upgrading project is the optimum solution for a current or future need or problem, alternative design and construction methods are considered and evaluated for carrying out the undertaking.

Typical alternative design solutions for water systems could include:

1. Expansion and/or upgrading of wells
2. Expansion and/or upgrading of surface water intakes
3. Expansion and/or upgrading of water treatment plants
4. Expansion and/or upgrading of high lift and booster pumping stations
5. Extention and/or upgrading of water distribution facilities

Typical alternative design solutions for sewage systems could include:

1. Expansion and/or upgrading of gravity sewers, vacuum lines, low pressure lines
2. Expansion and/or upgrading of pumping stations
3. Expansion and/or upgrading of communal subsurface disposal facilities
4. Expansion and/or upgrading of primary, secondary or tertiary treatment facilities
5. Expansion and/or upgrading of lagoon treatment facilities
6. Change of management practices and/or facilities for disposal or utilization of sludge

6. Geographic Area/Boundaries within which Undertaking will be Executed

An expansion or upgrading of an existing sewage or water system could occur in any settled portion of Ontario. It could occur in cities, towns, villages, townships, hamlets, or rural areas. While a map and an appropriate description of the area surrounding a specific project will be provided for each Schedule C project under this Class in the Environmental Study Report, it is impossible to provide a locational description in the Class Environmental Assessment document.

7. The Environment Affected or Possibly Affected, Either Directly or Indirectly

Because of the very broad geographic distribution in which projects within this Class may occur, a wide diversity of environmental settings may be encountered. Chapter III of the Environmental Study Report will include a description of the environment affected by specific Schedule C projects under this Class.

8. Remedial Measures for any Adverse Effects Due to the General Nature of the Class Document

Only examples of potential environmental condition changes and applicable types of remedial measures were identified (Appendix V and VI). Chapter V of the Environmental Study Report will be used to describe the protective measures to be taken for a specific Schedule C project under this Class.

9. Advantages and Disadvantages to the Environment of the Undertaking

Chapters IV and V of the Environmental Study Report would include a discussion of the advantages and disadvantages to the environment of the Schedule C undertaking.

10. All Studies and Reports Done in Connection with the Undertaking

All studies related to individual Schedule C projects will be reported and discussed in Chapter I of the Environmental Study Report.

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GLOSSARY OF TERMS

Alternative Solutions - alternative ways of solving a documented deficiency, including the alternative of doing nothing.

Bump-up - refers to a decision by the proponent or by the Minister that the environmental significance of a project is of such proportion that the procedures for environmental assessment provided for under the Class EA process are not sufficient, and that an individual environmental assessment must be made.

Class Environmental Assessment (EA) Process - a planning process used for a group of projects which are relatively small in scale, recur frequently, having a generally predictable range of effects and relatively minor environmental significance.

Class EA Document - a report documenting the Class EA process which is formally submitted under the Environmental Assessment Act. Once the Class EA document is approved, projects covered by the class can be implemented without having to seek further approvals under the EA Act provided the Class EA process is followed.

Combined Sewer - a sewer intended to carry surface runoff, sewage and industrial wastes.

Communal Facilities - facilities serving six or more private residences or one or more industrial establishments.

Construction Package - the documentation used to direct the contractor during project construction.

Contractor - anyone who carries out the construction of a project.

Deficiency - a documented shortfall in an existing sewage or water facility, for purposes of existing or future needs.

Dry Weather Flow - the combination of domestic sewage and industrial and commercial wastes found in sanitary sewers during the dry weather season of the year.

Environment - refer to section 1(c) of the Environmental Assessment Act.

Environmental Condition Change/Environmental Effect - a change in the existing conditions of the environment, both social and natural, which may have beneficial (positive) and/or adverse consequences.

Environmentally Significant (or Sensitive) Areas - natural areas having significant natural resource values or functions that may be susceptible to disturbances from human activity.

Environmental Study Report (ESR) - the documentation for a specific project which details the planning and decision-making process which has been followed and the mitigating measures which will be taken to ensure that the Environmental Assessment Act has been adhered to.

Erosion - the processes by which the ground surface is worn away by the action of wind and water. Also the process by which the bed and banks of a stream are worn away by the action of the water.

Eutrophication - the progressive enrichment of surface waters, particularly non-flowing bodies of water such as lakes and ponds, with dissolved nutrients, such as phosphorus and nitrogen compounds, which accelerate the growth of algae and higher forms of plant life.

Exempt Project - a project for which approval by the Minister of the Environment is not required under the Act.

Exfiltration - the escape of sewage from a sewer, into subsurface materials.

Existing Rated Capacity - the flow or volume capacity of the overall sewage or water system as certified under the Ontario Water Resources Act and/or the Environmental Protection Act, or as implied in the plans and specifications that were submitted to obtain the above mentioned certificates, or the current existing capacity where no technical documentation exists.

Feasibility Studies - testing, research or any action necessary to comply with the Act, such as exploratory drilling, soil sampling, etc. Feasibility studies are exempt from the Act.

Floodplain - the flooded ground along a stream course which is covered by water at flood stage.

Frontage Assessment Charges - lump sum payments required for linking individual residences or other structures into water mains or sewers. These charges are typically based on the length of `street frontage´ of the individual lot.

Full Environmental Assessment - an individual environmental assessment which requires the submission of a formal document for an undertaking to which the Act applies and which is not exempt nor covered by Class EA approval.

Groundwater - that portion of the subsurface water in the zone of saturation below the water table.

Groundwater Table - the free surface level of groundwater, subject to atmospheric pressure under the ground, generally rising and falling with the season, the rate of withdrawal, the rate of recharge, and other conditions.

Hazard Lands - lands which, because of their physical characteristics in combination with their location, sustain a risk for the occupants of loss of life, property damage and social disruption if developed.

Impervious - not permitting penetration or passage of water or other liquids.

Infiltration - the passage of water into soil. The term is also used to refer to water entering the sewer system through points such as defective pipes, pipe joints, connections and manhole walls. It includes all extraneous water such as groundwater and surface water, but does not include normal sewage inflow.

Minister - the Minister of the Environment.

Mitigating or Remedial Measures - measures that are incorporated into the project that are intended to reduce, eliminate or ameliorate the negative consequences of an environmental condition change.

Notification - where notice is given or service is made by prepaid mail, the giving or service shall be deemed to be made on the seventh day after the day of mailing, unless the person to whom notice is given or on whom service is made, establishes that he did not, acting in good faith through absence, accident, illness or other cause beyond his control, receive the notice, order, approval or other document until a later date.

When the proponent is of the opinion that, because the persons who are to be given notice are so numerous, or for any other reason it is impractical to give the notice to all or any of the persons individually, the notice may be given to the persons by public advertisement or otherwise, and the date on which such notice is first published or otherwise given, shall be deemed to be the date on which the notice is given.

Operation - operating, maintaining and repairing where the purpose, use, capacity and location remain the same.

Pollutant - dredged soil, solid waste, incinerator residue, sewage, garbage, sludge, chemical wastes, biological materials, radio-active materials, heat, wrecked or discarded equipment, rock, sand, dirt and industrial, municipal and agricultural waste discharged into water.

Primary Treatment - processes or methods for the treatment of sewage and other wastes intended for the removal of solids by gravity and sedimentation. It provides no changes in dissolved and collodial matter in the sewage or waste flows.

Project - a specific activity planned and implemented with a Class EA approval. A project consists of all those activities necessary to solve a specific sewage or water servicing problem.

Proponent - the Ministry of the Environment is the proponent of all projects undertaken under this Class EA.

Public - interest groups, associations, utilities and individuals.

Review Agencies - government agencies other than the proponent.

Roof Drain - a drain or pipe that conducts storm water from the roof of a structure, downward and into a sewer for removal from the property, or onto or into the ground for seepage disposal of runoff.

Runoff - that portion of the precipitation on a drainage area that is discharged from the area into stream channels.

Sanitary Sewer - a sewer which carries sewage and those industrial wastes permitted by sewer use bylaws.

Screening - the contact made by the proponent with government agencies and the public for the purpose of giving notification of and soliciting comments on a proposed project.

Secondary Treatment - processes or methods for further treatment of sewage and other wastes, usually following primary treatment, to obtain additional improvement in the quality of the treated wastes.

Sediment - soils or other surface materials transported by wind or water as a result of erosion.

Sedimentation - the process of deposition of suspended matter carried by water, sewage, or other liquids, by gravity.

Sewage - sanitary wastes, drainage water, storm water, commercial wastes and industrial wastes.

Sewage Collection System - includes service branches, trunk and local sewers, and pumping stations, but does not include any sewage treatment facilities.

Storm Sewer - a sewer which carries storm water and surface water, street wash and other wash waters or drainage, but excludes sewage and industrial wastes.

Surcharge - the flow condition occurring in closed conduits when the sewer or water main is pressurized or the hydraulic grade line is above the crown of the sewer or water main.

Tertiary Treatment - process or method for the supplemental treatment of sewage and other wastes which results in additional improvement in the quality of the treated wastes than is achieved by conventional secondary treatment.

The Act - the Environmental Assessment Act, 1975, or the EA Act.

Undertaking - the process by which projects within the class are planned and implemented.

Utility Corridor - lands or rights to land for purposes of locating sewage, water, power or other such services.

Water Crossing - the provision of a collection or distribution system over or under watercourses including lakes, rivers, canals, ponds, bogs, marshes, swamps, creeks, streams, etc.

Water Distribution System - service connections, supply, trunk and local distribution mains, pressure reduction stations, pumping stations and storage facilities, but does not include water treatment facilities.

Water Main - a pipe which carries water from the source/purification plant and distributes it to individual users.

Water Table - a surface or point of transition between the zone of aeration and the zone of saturation.

Water Treatment/Water Purification - those processes by which `raw' water is treated to remove bacteria, and possibly algae, colour and suspended material in order to meet the minimum water quality objectives for human consumption.

Wet Weather Flow - a combination of dry weather flows, infiltration and inflow which occurs as a result of rain and storms.

1.0 INTRODUCTION

This document is a Class Environmental Assessment submitted to the Minister of the Environment in accordance with the provisions of The Environmental Assessment Act, 1975. It applies to a group of projects, or undertakings, which result in the expansion or upgrading of existing water and sewer systems. The Ontario Ministry of the Environment is the proponent of such projects.

Part 1 of the document explains the purpose and status of the Class EA. The reasons for considering these expansion or upgrading projects as a group or Class are presented, the history of the document and phasing-in procedures are summarized.

Part 2 defines the activities covered by the Class EA. It explains the general characteristics of sewage treatment and water supply projects and the problems they would remedy. It describes other options that could be used to accomplish the Ministry's objectives in place of an expansion or upgrading project in this Class. It discusses the alternative design and construction methods that may be considered to actually carry out an expansion or upgrading project. The level of planning and documentation required for different types of activities is specified. It explains how to deal with sludge management activities, operational facilities, retirement of facilities and situations where there are joint proponents of an undertaking. Part 2 also details the circumstances in which an individual Environmental Assessment may be required for a project in this Class.

Part 3 generalizes the planning and design process for the numerous projects in this Class. It outlines the engineering and associated environmental work flow and the technical review and approval activities necessary to implement an undertaking. The involvement of the public, government agencies and the Environmental Assessment Branch in the design process is also discussed.

Part 4 defines typical environments and outlines the potential effects that an undertaking may have on the various environmental components. Provisions for mitigating environmental impacts are also presented.

Part 5 deals with the Environmental Study Report which will be written for each Schedule C activity in this Class. It describes the format of this report and provides a typical outline of what it should contain. It specifies methods for revising the ESR and monitoring to ensure that programs and projects are fulfilling the intent of The Environmental Assessment Act.

Part 6 details specific procedures for conducting public participation and making the document available to other agencies. Environmental monitoring, bump-up procedures, property acquisition, amendments to the Class EA, applicable legislation, and duplication in hearing are also discussed.

The **appendices** to the document provide supportive and explanatory information necessary for complete review and utilization of the document. Typical environmental concerns associated with the undertakings are indicated and examples given of remedial measures to mitigate adverse environmental condition changes. A description is provided of environmental considerations to be taken into account in construction of such projects, and relevant provincial legislation, regulations and guidelines are listed. Existing sewage and water treatment systems are illustrated and described.

This Class Environmental Assessment document is a commitment by the Ministry of the Environment to a consistent line of action in undertaking the design, construction and operation of expansion or upgrading projects. It is also a commitment to accept responsibility for the development and implementation of measures to mitigate any adverse environmental condition changes associated with any project in this Class.

This document serves as a guideline for:

- Ministry of the Environment personnel in the implementation of programs to expand or upgrade sewage and water systems in accordance with the Environmental Assessment Act, 1975; and

- interested individuals, groups and agencies, in their monitoring of this Ministry's activities in this Class of undertakings.

Through submission of this document, the Ministry of the Environment is requesting approval to plan, design and construct expansion and upgrading projects without subsequent individual approvals under the Environmental Assessment Act, 1975. This approval is subject to MOE's commitment to prepare and submit an Environmental Study Report for each Schedule C activity in this Class and to the conditions outlined in Section 2.8 "Individual Environmental Assessments". The projects in this Class will remain subject to any other approvals as may be required under legislation other than The Environmental Assessment Act, 1975.

1.1 Purpose of the Class Document

The Environmental Assessment Act permits a proponent to prepare environmental assessments for undertakings subject to the Act on either an `individual´ or on a `class´ basis. Approval of a Class Environmental Assessment allows the design and construction of any project in this Class to proceed without subsequent approvals by the Minister of the Environment and the Environmental Assessment Board with respect to the provisions of the Environmental Assessment Act, 1975. The Class EA, therefore, provides a significant relief from the full requirements of the Environmental Assessment Act, while still ensuring that potential social, economic and environmental effects are considered in the planning process.

The operation, maintenance or retirement of facilities under the Class EA may influence the significance of environmental impacts. In most cases, these impacts will be limited, but in some cases, major impacts may result. It is expected that the significance of impacts will be identified during the course of the planning process and effective mitigation chosen, or re-analysis of the project will occur.

The projects covered by this document, when taken as a group can be described as expansions, upgradings or operation of existing sewage and water systems. The Ministry of the Environment considers that this group of projects merits consideration as a Class undertaking because of important characteristics which the individual projects have in common:

- the projects are proposed to solve a common problem or achieve a common goal;
- they occur frequently and apply only to existing sewage and water systems;
- the process of design and construction is basically the same for projects of this type;
- the projects in this Class generally result in predictable, relatively minor local environmental changes.
- operation and maintenance of facilities follow prescribed guidelines throughout the province.

1.2 Submissions and Approvals to Date

This Class EA Document was originally prepared as two separate Class EAs: "Expansion or Upgrading of an Existing Water System" and "Expansion or Upgrading of an Existing Sewage System". These documents were submitted to the Environmental Assessment Branch of MOE in early 1980.

In September 1982, MOE formally revised the two Class EAs through submission of an addendum amending the documents. The amendments covered nine major topics:

- Clarification of the scope of the Class EAs
- Opportunities for public and government involvement throughout the planning
- Related legislation and hearings provisions
- Class EA treatment of the activity of property acquisition
- Construction guidelines
- Monitoring program requirements

- Provision for changing project status (Bump-up)
- Revision and addenda to Environmental Study Reports
- Class EA amendment procedures

The three documents were reviewed by the Environmental Assessment Branch and other government ministries. No significant environmental problems with the documents were identified, and the documents received Minister's approval on September 29, 1983 with Order-in-Council No. 2731/83.

A number of conditions were attached to the approval. The main condition of approval was that the three documents be amalgamated into a single Class Environmental Assessment, incorporating the concerns of the Environmental Assessment Branch. This Class Document is being prepared to fulfill this stipulation.

1.3 Phasing-In

Phasing-in provisions are usually prepared for Class EA's which have no previously approved format under the Environmental Assessment Act, or for those Class EA's which differ greatly in the treatment of projects from previously approved documents. The phasing-in provision permits projects at an advanced stage of planning to enter the Class EA planning process at that stage. In such cases, the Environmental Study Report for Schedule C activities documents the status of the project at the time the regulation comes into force and documents the remaining planning requirements.

In the case of this Class EA, there are three previously approved documents that vary little in content from this document. Expansion, upgrading and operation of sewage and water facilities will follow these approved guidelines until this Class EA comes into effect. Phasing-in requirements will be negligible and will be related primarily to monitoring procedures.

2.0 DESCRIPTION OF THE UNDERTAKINGS

Projects within this Class can generally be described as expansions to or upgradings of existing sewage and water systems. For the purposes of this document, an expansion refers to the addition of new equipment, facilities or management practices to increase system capacity. An upgrading consists of additions or replacements of existing equipment, facilities or practices which are intended to achieve a higher level or quality of system performance, while not increasing system capacity. Changes in operation activities are also considered to be an upgrading project.

In an individual problem situation, it may be necessary to solve the problem or meet the need by employing either an expansion solution or an upgrading solution, or both.

The scope of the activities which are covered by the Class EA is limited to activities carried out in connection with existing sewage and water facilities provided under Section 43 or provided or operated under a contract pursuant to Section 34 or 7(2) of the Ontario Water Resources Act (R.S.O. 1980). The Class EA also covers activities carried out on waste management systems regulated under Part V of the Environmental Protection Act (R.S.O. 1980 and Regulations made thereunder), where those systems are a part of a sewage or water works as defined above. Activities carried out in connection with the expansion or upgrading of existing sewage facilities, owned or operated by the Crown, and regulated under Part VII of the Environmental Protection Act (R.S.O. 1980 and Regulations made thereunder), are also covered in the Class EA.

The purpose of defining the scope of the activities covered by the Class EA is to clarify that activities including changes in the operation of sewage and water facilities and the establishment and operation of processed organic waste management facilities, (e.g. agriculture utilization and landfilling of sludge), and sewage systems such as communal tile beds can be handled under Class EA procedures.

It should be understood that the proponent of the activities that are covered by the Class EA is the Ministry of the Environment. Although the Environmental Approvals and Project Engineering Branch is responsible for undertaking the majority of capital construction activities carried out on provincial sewage and water facilities, certain activities regulated under the Ontario Water Resources Act and/or the Environmental Protection Act, such as the management of sludge, and activities involving the operation of sewage and water facilities are carried out by the Utility Operations Sections of the six Regional Offices of MOE.

The term "existing", when used to define the scope of the activities covered by the Class EA, requires definition. An existing facility includes not only a sewage or water facility which has been constructed, but also includes a facility which has not yet been constructed but which is in compliance with the Environmental Assessment Act and has received approval under the Ontario Water Resources Act and/or the Environmental Protection Act.

This permits the Class EA to have application to situations where MOE wishes to establish an extension to another facility (e.g., a pumping station), where the other facility has not yet been built but must be considered as being in existence as a result of the approvals commitments that have been made to its establishment.

This definition of the scope of activities covered by the Class EA extends Class EA procedures to a number of activities. For example, the action of abandoning an existing groundwater source and going to a surface water source associated with an existing water facility is within the definition of the projects covered under the Class EA. The activity of instituting a change to the technique of treating sewage within an existing sewage system, such as replacing a package treatment plant with a lagoon treatment system is also within the definition of the projects covered.

The only activities which are not within the definition of the activities covered by the Class EA are activities involving the establishment of new sewage or water facilities. A new sewage or water facility is a facility with no connection to an existing sewage or water facility (as defined above), through a physical or process link. The establishment of a new sewage or water facility, when undertaken by MOE, is considered to be a major undertaking and therefore is not appropriate for inclusion in the Class EA. An individual environmental assessment will be prepared in each case where the establishment of a new sewage or water facility is proposed to be provided by MOE.

An overview description of the typical components of sewage treatment and water supply systems is given below to assist the reader in identifying where undertakings within this Class would fit within the total system. In this section of the Class document, activities are placed into three categories, depending upon their potential environmental impact and planning requirements. Operational activities, retirement facilities, sludge management activities, co-proponency and requirements for individual environmental assessments are also discussed below.

2.1 Sewage Treatment Systems

2.1.1 Description

Appendix 1A illustrates and describes the processes and equipment utilized in existing sewage systems.

The sewage systems in operation in Ontario are comprised of three basic components, **collection** and **treatment** of raw sewage and **management** of sludge wastes. The following lists the principal facilities and management practices associated with each of these components.

The **collection** component of a sewage system collects raw sewage from a source and delivers it to the treatment component via one or more of the following:

- gravity sewers
- vacuum lines
- low pressure lines
- pumping stations
- forcemains

The **treatment** component consists of one or more of the following facilities:

- an individual septic tank and tile field (servicing one sewage discharge point)
- a communal septic tank and tile field (servicing a number of sewage discharge points)
- a Sewage Treatment Plant (STP) providing what is called "Primary" treatment
- a lagoon or "waste stabilization pond"
- an STP providing "Secondary" treatment with or without Primary treatment
- an STP providing Secondary **and** "Tertiary" treatment (it may or may not also include Primary Treatment)

Each of the above treatment facilities uses different processes and requires different sets of equipment. These processes and equipment are illustrated in Appendix 1A. All STP's and lagoons produce wastewater and sludge (the solids removed from sewage).

The **sludge management** component consists of one or more of the following facilities or practices:

- disposal of sludge at a licensed sanitary landfill site or by burning it in an incinerator
- utilization of sludge by applying it to soil conditioning sites or by composting
- a sludge transfer station to store sludge on a temporary basis

The above facilities and practices are further explained in Appendix 1A, and Section 2.5 describes sludge management activities under the Class EA in more detail.

For the purposes of this **Class Environmental Assessment** an expansion or upgrading project may include one or more of the following changes to an existing system:

1. extension or upgrading of sewers (gravity sewer, vacuum line, low pressure line)

2. expansion or upgrading of pumping stations

3. expansion or upgrading of communal subsurface disposal facilities

4. expansion or upgrading of sewage treatment plants

5. expansion or upgrading of lagoon treatment facilities

6. a change in management practices and/or facilities for the disposal or utilization of sludge

Alternative methods of carrying out each of the above changes are discussed in Section 2.1.4.

Most projects in this Class will alter the physical characteristics of the respective sewage systems by requiring, for example:

- construction of new buildings or additions to existing buildings
- acquisition of additional land area to house the facilities, either at existing sites or new locations
- extension of existing sewer easements
- acquisition of additional land to maintain the appropriate buffer zone between adjacent uses and the treatment facilities

2.1.2 Purpose

The projects in this Class will be proposed to resolve problems affecting the operation and efficiency of existing sewage systems and/or to accommodate future growth of communities.

Projects in this Class will be proposed to achieve one or more of the following six general objectives:

1. to reduce public health problems or nuisances

2. to improve the quality of effluent produced by the sewage system

3. to improve the management of sludge waste produced by the system

4. to expand the capacity of the sewage system

5. to prevent system failure

6. to accommodate design improvements or new technology

The specific purpose for any one expansion or upgrading project is developed in the design process and documented in an Environmental Study Report for each Schedule C project under this Class EA.

The purposes or objective of a specific project will be determined by the present or forecasted problem(s) affecting the operation and efficiency and the present or forecasted demand for increased system capacity.

The following subsections describe the types of problems and demands which singularly or in combination may require an expansion and/or upgrading project.

1. Problems Associated with Public Health

The well-being of human life may be affected by, or nuisances caused by such problems as:

- contamination of groundwater or surface water supply used for human consumption, livestock watering or irrigation
- failure to meet air quality requirements at sludge incinerators
- failure of the system resulting in the backup of raw sewage through the sewers into basements
- odour from the sewage treatment facilities, or from a sludge transfer station
- noise from operation of a pumping station or from the Sewage Treatment Plant
- traffic hazards, nuisance or noise from trucking of sludge

2. Problems Associated with Effluent Quality

Objectives for water quality in all water resources in the province have been established. These objectives include criteria governing the physical and inorganic characteristics of water bodies (e.g. temperature, dissolved oxygen, chlorine, phosphorous) and the allowable concentrations of heavy metals and pesticides. The quality of the effluent produced by a sewage treatment plant must be adequate to ensure that minimum standards set for the receiving water body can be achieved.

An expansion or upgrading project may be required, therefore, due to the current or forecasted quality of effluent produced because of such problems as:

- inefficient operation of the treatment facility
- outdated original design of the system
- original design criteria are no longer acceptable due to changes in quantity and quality characteristics of sewage being treated
- industrial waste discharges contain chemicals toxic to the biological treatment process used in the treatment facility
- changes in policies and guidelines for sewage treatment processes and for the receiving water body
- changes in the physical and chemical characteristics of the receiving water body due to upstream discharges
- insufficient dilution of effluent by receiving water body

3. Problems Associated with Management of Sludge Waste

The need for the project may result from problems such as:

- the sanitary landfill site(s) at which sludge is currently being disposed of may be at or near capacity
- the agricultural lands or soil conditioning sites at which sludge is utilized may be at or near capacity
- the constituents of the sludge may make it unacceptable for disposal/utilization at existing available sites
- Ministry policies or guidelines for sludge disposal/utilization may have changed

4. Problems Associated with System Capacity

The existing sewage system would not be capable of handling present or forecasted volumes of sewage due to such problems as:

- system is at or approaching its original design capacity and cannot accommodate increased volumes of sewage
- outdated original design or construction of the system
- deterioration in the condition of the system
- infiltration of groundwater into the collection system
- illegal connections into the collection system
- changes in design philosophy

5. Problems Requiring Consideration of Design Improvements and New Technology

The system may be considered inefficient for reasons including:

- increased cost of using existing equipment
- equipment does not meet performance specifications
- outdated design of system
- introduction of new technology

6. Problems Associated with Potential System Failure

Concern may be expressed as to potential system failure due to such factors as:

- deterioration of system components due to age or chemical attack
- structural failure of system components
- repeated equipment breakdown
- inadequate original design or construction of system

2.1.3 Alternatives to the Undertaking

In many instances, there may be more than one way of solving problems or meeting new demands on existing sewage systems. One type of solution which may be considered is an expansion or upgrading project. Solutions other than an expansion or upgrading which may also be considered are called Alternatives to the Undertaking, some of which are listed below.

1. Modify operational practices at the treatment facility

2. Expand maintenance program

3. Improve individual septic systems

4. Reduce sewage flows

5. Reduce industrial discharge

6. Improve community stormwater management

7. Limit community growth

8. Discharge to an adjacent existing sewage system

9. Do nothing

Depending on the nature of the existing sewage system and of the problems being encountered or forecasted, there are variations in the ways these general alternatives to the undertaking could be carried out. The most common of these variations are described in the following subsections.

In reviewing these subsections there are a number of factors that should be kept in mind:

a. A sewage system comprises a series of **interrelated components.** Therefore, many of the potential Alternatives to the Undertaking may resolve more than one of the six general problems previously described.

b. The **feasibility** of the Alternatives to the Undertaking will depend, in part, on the nature and location of the sewage system, the nature and location of the problem(s) and on the comparative cost of the alternative solutions.

c. It is possible that the **only** feasible solution to the problem(s) may be an expansion and/or upgrading project in this Class. Conversely, there may also be **one** or **more** feasible Alternatives to the Undertaking which merit consideration in addition to the expansion or upgrading project.

d. An Environmental Study Report (see Part 5 of this document) **will not be prepared** where the final recommended solution is one or a combination of the Alternatives to the Undertaking. Such a recommendation would typically be made where it is evident that the costs of the particular expansion and/or upgrading project, both financial and environmental, significantly outweigh the benefits to be derived.

e. Where the **final recommended solution** is an expansion or upgrading project in this Class, the Alternatives to the Undertaking will be documented and evaluated in the Environmental Study Report prepared for the specific Schedule C project.

f. The Ministry of the Environment does not have the responsibility or the mandate to carry out **all** of the Alternatives to the Undertaking listed in the following subsections. In various instances, MOE may act only in an advisory capacity to municipalities or other government agencies, for example, with respect to alternatives aimed at reducing sewage flows, reducing industrial discharge, implementing community stormwater management, and limiting community growth.

The following alternative actions may solve one or more of the general problems previously described:

1. Modify Operational Practices at the Treatment Facility

(a) Limit operating hours of noisy equipment to reduce sound levels

(b) Reschedule the timing for or haulage routes of trucks removing sludge from the treatment facility to minimize traffic and safety problems

(c) Alter quantities of sludge stored at the treatment facility and/or duration of sludge storage to minimize odour problems

(d) Alter timing or duration of land treatment

(e) Ensure that the operator of the treatment facility is following proper procedures to optimize operational efficiency

(f) Undertake training programs to upgrade operators' understanding of treatment procedures and Ministry policies, guidelines and practices

2. Expand Maintenance Program

(a) Cleaning of the sewage system to improve treatment efficiency and hydraulic characteristics

(b) Undertake normal maintenance activities such as equipment overhaul, replacement of parts, repair of damaged tanks

3. Improve Individual Septic Systems

(a) Repair or enlarge existing septic tanks and/or tile fields

4. Reduce Sewage Flows

(a) Enforce municipal by-laws with respect to permitted connections to the sewage collection system

(b) Maintain the collection system to minimize groundwater infiltration into the sewers

(c) Initiate a community water conservation program in order to reduce overall sewage discharge volumes

(d) Service proposed development with individual/communal subsurface disposal systems in order to minimize additional sewage load

5. Reduce Industrial Discharge

(a) Enforce existing municipal Industrial Waste By-Law which sets criteria for quality of industrial sewage discharge

(b) Adopt an Industrial Waste By-Law in municipality

(c) Amend existing Industrial Waste By-Law in order to require pretreatment of sewage or in-house process changes at industrial plants

6. Improve Community Stormwater Management

Where combined stormwater and sanitary sewer and treatment facilities exist, the following alternatives may be considered:

(a) Provide or expand temporary or permanent runoff storage facilities to accommodate wet weather peak runoff flows

(b) Install inlet controls, as part of normal maintenance activities to prevent surcharge of combined sewers during wet weather peak runoff periods

(c) Improve street maintenance program to minimize grit and solids entering sanitary sewers where combined or interconnected with storm sewer system

(d) Recommend that municipal/provincial approval for new developments require the incorporation of urban runoff control measures

(e) Recommend that municipal/provincial approvals for major phased development be based on a comprehensive master drainage plan and a comprehensive pollution control strategy for the community, with appropriate policies to be included in the municipal Official Plan

7. Limit Community Growth

(a) Limit the ultimate extent and/or location of proposed residential, industrial and commercial growth in the community

(b) Phase or schedule proposed growth in the community with respect to both location and implementation timing

8. Discharge to an Adjacent Sewage System

(a) Discharge sewage from existing or proposed development into an existing sewage system located in an adjacent municipality

9. Do Nothing

In the Do Nothing alternative, no improvements or changes would be made to solve the identified problem(s). This means that the problems would remain in the system. It does not necessarily mean however, that no further development in the community would occur. The Ministry of the Environment has the responsibility of making recommendations on proposed developments but it is the Ministry of Housing (or the Regional Municipality) which grants the ultimate approvals.

Where an expansion or upgrading project in this Class is one of the alternative solutions considered, and is the recommended solution, the Do Nothing alternative will also be investigated. The Do Nothing alternative will be documented in the Environmental Study Report along with any other alternatives to the undertaking which were examined.

The Do Nothing alternative may be actually implemented at any time during the design process prior to the commencement of construction. A decision to Do Nothing would typically be made when the costs of all other alternatives, both financial and environmental, significantly outweigh the benefits.

2.1.4 Alternative Methods of Carrying Out the Undertaking

This section describes **the various ways** that could be considered for carrying out a specific expansion or upgrading project. These are referred to as the Alternative Methods of Carrying Out the Undertaking and differ from the Alternatives to the Undertaking in that the latter refer to **options which might be recommended instead** of an expansion or upgrading project in this Class.

For a specific expansion or upgrading project, the Alternative Methods of Carrying Out the Undertaking may comprise both alternative **design solutions** and alternative **construction solutions.**

In the following subsections, the typical alternative **design solutions** are grouped by the sewage system facility for which they would normally be considered. These facilities are:

1. Gravity Sewers, Vacuum Lines, Low Pressure Lines

2. Pumping Stations

3. Communal Subsurface Disposal Facilities

4. Primary/Secondary/Tertiary Treatment Facilities

5. Lagoon Treatment Facilities

6. Sludge Management System

In reviewing the six subsections, there are a number of factors which should be kept in mind:

a. A sewage system, as previously emphasized, comprises a series of **interrelated components.** As a result, the Alternative Methods of Carrying Out the Undertaking may resolve more than one of the six general problems. For example, major repairs undertaken to minimize infiltration into gravity sewers may alleviate loading problems experienced at the lagoon treatment facility serving the community. As a result, the planned expansion of the lagoon system may be designed for a lesser ultimate capacity than was originally envisaged on the basis of existing and projected future sewage loading.

b. The **feasibility** of the various Alternative Methods of Carrying Out the Undertaking will depend, in part, on the nature and location of the sewage system, the nature and location of the identified problem(s) and the comparative cost of the design alternatives.

c. It is possible that **only one or conversely several** of the potential Alternative Methods of Carrying Out the Undertaking will be feasible.

d. The Alternative Methods of Carrying Out the Undertaking which are considered for a **particular** Schedule C expansion or upgrading project will be documented in the Environmental Study Report for that project.

e. **The Alternative Methods of Carrying Out the Undertakings listed in the following subsections represent the most <u>common design solutions</u> which would be considered for an expansion or upgrading project in this Class. These lists should <u>not</u>, however, be misconstrued as all-inclusive.**

1. <u>Expand and/or Upgrade Gravity Sewers, Vacuum Lines, Low Pressure Lines</u>

(a) Extend the sewers to service new development

(b) Replace the existing sewers with a larger size

(c) Provide relief sewers

(d) Add tankage along with the collection system to provide in-line interim storage to even out sewage loads discharged to treatment facility

(e) Undertake major repairs of damaged sewers and manholes

(f) Provide sewers with a liner to minimize chemical attack problems

(g) Reline existing sewers to reduce infiltration problems

2. Expand and/or Upgrade Pumping Stations

(a) Install additional pumps

(b) Replace existing pumps with improved design/new technology

(c) Provide pilot pump and/or variable speed pumps to alter loading characteristics and improve efficiency/capacity

(d) Provide additional or improved screening (to break down clots in sewage)

(e) Duplicate existing forcemain

(f) Reroute sewers to eliminate need for a pumping station

(g) Undertake measures to reduce septicity in the wet well, such as the addition of aeration, oxygen injection or disinfection equipment; reduction in size/division of the wet well

(h) Provide for chemical addition equipment. This equipment would complement and/or reduce the need for subsequent chemical addition at the treatment facility

(i) Undertake major repairs to pumping station and forcemains

(j) Provide for standby diesel generator as alternative power source to prevent sewage overflow and backing up in gravity sewers during power outages

3. Upgrade and/or Expand Communal Subsurface Disposal Facilities

(a) Increase size of communal septic tanks or tile fields

(b) Replace septic systems with aerobic package plant(s)

(c) Undertake extensive repairs to meet the design and operation criteria of Ontario Regulation 229

(d) Construct a new lagoon treatment facility to supplement or replace an existing communal subsurface disposal system.

4. Expand and/or Upgrade Primary/Secondary/Tertiary Treatment Facilities

(a) Duplicate key treatment components, such as settling tanks, aeration basin

(b) Add flow equalization tankage to even out the loading of sewage through the various treatment stages

(c) Replace existing pumps with improved design or other pumps such as variable speed or a combination of pumps with different capacities in order to prevent high hydraulic loadings

(d) Provide additional equipment for addition of chemicals

(e) Provide secondary treatment for a primary treatment facility

(f) Provide tertiary treatment for a secondary treatment facility

(g) Provide/expand effluent storage with controlled discharge so as to discharge the effluent in proportion to stream flow quantity

(h) Provide new or modified disinfection equipment

(i) Provide standby power to ensure some treatment during power outages

(j) Cover tankage in the treatment facility to reduce odour

(k) Reduce sound levels by enclosing treatment components and/or sound-insulating buildings

(l) Introduce design improvements/new technology to improve the performance and efficiency of the treatment facility

(m) Replace outfall with a larger size

(n) Duplicate outfall at the existing or new location in the receiving water body

(o) Install pumps to increase the rate of flow through the outfall pipe thereby increasing the outfall capacity

(p) Provide for total or partial land application of effluent through spray irrigation

(q) Extend the length of the outfall to increase effluent dilution by the receiving water body

(r) Add diffusers to the outfall to increase effluent dilution by the receiving water body

(s) Provide the outfall with a liner to minimize chemical attack

(t) Construct a new sewage treatment plant within an existing collection and treatment system to replace or supplement an existing sewage treatment plant or lagoon treatment facility

5. Expand and/or Upgrade Lagoon Treatment Facilities

(a) Add additional cells to the lagoon

(b) Provide additional treatment facilities such as: aeration, chemical addition, post-treatment

(c) Change operation of the system, for example from "continuous discharge" method to bulk discharge method (i.e. twice annually) or to seasonal discharge (i.e. November to April only). In most cases this alternative would require the addition of lagoon cells

(d) Provide new/additional land treatment component for spray irrigation, overland flow, or infiltration-percolation methods

(e) Expand the buffer zone between the lagoon facility and adjacent uses to minimize odour impacts

(f) Expand the buffer zone between the land treatment area and adjacent uses

(g) Undertake major repairs to facility such as lagoon berms, impermeable lining of lagoon, mechanical equipment

6. Change Management Practices and/or Facilities for Disposal/Utilization of Sludge

(a) Utilize alternative chemicals or quantities of chemicals and/or chemicals and/or chemical dosing methods to reduce heavy metal characteristics in sludge thereby making it acceptable for disposal/utilization

(b) Provide/enlarge sludge dewatering equipment

(c) Maintain or improve sludge dewatering equipment to increase process efficiency and reduce sludge volume

(d) Provide additional sludge thickening equipment and tankage

(e) Expand existing contingency sludge storage facilities at the sewage treatment plant or transfer station to alleviate scheduling problems for sludge disposal/utilization

(f) Alter the application rate of sludge disposal at existing landfill sites and existing or new agricultural sites

(g) Provide sludge composting facilities to complement/substitute for existing disposal/utilization methods

(h) Commence sludge disposal at new landfill sites

(i) Construct a new sludge incinerator to complement/substitute for existing disposal/utilization methods

(j) Introduce design improvements/new technology to improve the performance and efficiency of the treatment facility

2.1.5 Alternative Construction Solutions

Various construction activities typically involved in expansion or upgrading projects in this Class have potential for adverse environmental impact. As part of the design process for projects in this Class, therefore, **various feasible construction methods** will be examined with the objective being to minimize such potential impacts. The construction alternatives considered will be documented for Schedule C activities in the Environmental Study Report.

The feasible construction alternatives which may be considered will depend, in part, on the nature and location of the sewage or water system, the nature and location of the proposed expansion or upgrading work(s), and on the comparative cost of the alternative construction methods. It is, of course, possible that only one feasible construction method may require consideration in order to select those that minimize adverse impacts.

An expansion or upgrading project in this Class will be carried out under contract let by competitive tender. The selected contractor is normally, but not necessarily, the lowest bidder.

Where adverse environmental impacts resulting from Schedule C construction activities have been identified during the design process, the requirement for **special provisions** will be identified in the Environmental Study Report and they will also be written into the project construction specifications. These provisions will, to the extent necessary, indicate such restrictions as the mode of operation allowed, timing, sequence, duration, and remedial work required. Appendix VII contains the "Environmental Considerations for the Planning and Construction of Provincial Sewer and Water Projects" as an illustration of the type of guidelines followed in identifying **special provisions.**

Where an adverse impact occurs during construction and was not identified previously, the problem will have to be dealt with on-site under the direction of the construction supervision personnel. If, after consultation with affected parties, this impact is considered significant by the proponent **an Addendum to the Environmental Study Report** will be written (see Part 5.3).

The contractor implementing an expansion or upgrading project in this Class is subject to **construction supervision** from commencement of the work until all work is completed to the satisfaction of the Ministry of the Environment. The construction supervisor's role is to ensure that the contractor meets the contract design requirements and complies with all specifications, special provisions and pertinent legislation. Lack of compliance by the contractor may result in the contractor being required to undertake remedial or additional work at his own cost, forfeiture of posted bond money and, potentially, prosecution for breach of contract.

2.2 Water Supply Systems

2.2.1 Description

Appendix 1B illustrates and describes the processes and equipment utilized in existing water supply systems.

Existing water systems are comprised of three major components:

- **source**
- **treatment**
- **distribution**

The **source** of water for a community may be either from a surface water body (such as a lake or river) in which case an intake pipe extends into the water body, or from a groundwater aquifer in which case water is pumped from a well or wells. Some municipalities may utilize both water sources, while many residential and commercial areas, industrial plants and most rural residences are served by individual wells.

The quality of the source of water supply is what mainly determines the degree and type of treatment necessary. Where the community draws its water from a surface water source, treatment will be necessary as surface water contains bacteria, and may be turbid, coloured or contain algae.

Where the community is serviced by a communal well or wells drawing on groundwater supplies treatment may or may not be necessary.

The **treatment** component will typically comprise a water treatment facility in which the incoming water is treated to remove turbidity, algae and colour and which pumps treated water into the distribution system.

The **water distribution** component for communal systems will consist of water mains and may also include booster pumping stations and storage facilities.

For the purposes of this **Class Environmental Assessment** a typical expansion or upgrading project may include one or more changes to an existing system such as:

1. extension or upgrading of a source component, e.g.
   - deepen a well into the currently used aquifer
   - drill new wells into new aquifers
   - extend intake pipe further into a source water body
   - utilize a new source water body
   - major repairs to a source component

2. extension or upgrading of a treatment component, e.g.
   - enlarge water treatment plant
   - add to existing water treatment processes in water treatment plant
   - add fluoridation process at water treatment plant
   - major repairs to a water treatment plant
   - add a new treatment process in existing treatment plant

3. extension or upgrading of distribution component, e.g.
   - extend water mains to service new communities
   - add booster pumps, storage facilities
   - major repairs to water mains, booster pumps or storage facilities

Alternative methods of carrying out each of the above changes are discussed in Section 2.2.4.

Most projects in this Class will alter the physical characteristics of the respective water systems by requiring, for example:

- construction of new buildings or additions to existing buildings
- acquisition of additional land to house the facilities, either at existing sites or new locations
- extension of existing easements for water mains
- acquisition of additional land to maintain the appropriate buffer zone between adjacent uses and the water treatment plant, the booster pumping station or the storage facility

2.2.2 Purpose

The projects in this Class will be proposed to resolve problems affecting the operation and efficiency of existing water systems and/or to accommodate future growth of communities.

Projects in this Class will be proposed to achieve one or more of the following six general objectives:

1. to reduce public health problems or nuisances

2. to improve the quality of water

3. to expand the capacity of the system

4. to prevent system failure

5. to improve disposal of treatment wastes

6. to accommodate design improvements or new technology

The specific purpose for any one expansion or upgrading project is developed in the design process and documented in an Environmental Study Report for each Schedule C project under this Class.

The purpose or objective of a specific project in this Class will be determined by the present or forecasted problem(s) affecting the operation and efficiency and present or forecasted demands for increased system capacity.

The following subsections describe the types of problems and demands which singularly or in combination may require an expansion and/or upgrading project.

1. Problems Associated with Public Health or Nuisances

   The well-being of human life may be affected by or nuisance caused by such problems as:

   - contamination of the water through the distribution system, for example, at storage reservoirs
   - noise resulting from the operation of the water treatment plant or booster pumping stations
   - groundwater contamination

2. Problems Associated with Water Quality

   Water may not conform to the water quality objectives as a result of such factors as:

   - deterioration in quality of the water source
   - change in Ministry policy and guidelines for water quality objectives for human consumption
   - inefficient operation of the water treatment plant
   - inadequate original design of the water treatment plant

3. Problems Associated with System Capacity

The existing water system may not be able to supply the quantities of water required and/or supply water at the required pressure due to such factors as:

- escape of water (exfiltration) from the water distribution network
- deterioration in the condition of the distribution system
- inadequate original design and/or construction of the system
- system unable to meet new demands since it is at or very near its original design capacity
- failure of the water source
- changes in design philosophy which affect capacity requirements

4. Problems Associated with Potential System Failure

Concern may be expressed as to potential system failure due to such factors as:

- deterioration of system components due to age
- repeated equipment breakdown over time
- evidence of structural failure over time
- inadequate original design or construction

5. Problems Associated with Disposal of Treatment Wastes

The existing water treatment plant may exhibit problems related to the disposal of wastes generated, which may be attributed to:

- excessive frequency of backwashing
- changes in Ministry policies and guidelines with respect to disposal of chemical sludge and of backwash water

6. Problems Requiring Consideration of Design Improvements or New Technology

The system may be considered inefficient for various reasons including:

- increased cost of maintaining existing equipment
- increased energy consumption
- equipment does not meet performance specifications
- inadequate original design of system

As noted, any of these problems, or a combination of these problems could initiate the need for an expansion and/or upgrading project. The identification of these needs is assisted by the ongoing review of capacity and operation of existing water systems under the Ministry's jurisdiction, as carried out by staff of the Ministry's six Regional Offices in the provinces.

2.2.3 Alternatives to the Undertakings

In many instances, there may be more than one way of solving problems or meeting new demands on existing water systems. One type of solution which may be considered is an expansion or upgrading project. Solutions other than an expansion or upgrading which may also be considered are called Alternatives to the Undertaking, some of which are listed below:

1. Modify operational practices at the Water Treatment Plant

2. Expand maintenance program

3. Reduce water demand

4. Obtain water from another source

5. Limit community growth

6. Do Nothing

Depending on the nature of the existing water system and of the problems being encountered or forecasted, there are variations in the ways these six general Alternatives to the Undertaking could be carried out. The most common of these variations are described in the following subsections.

When reviewing the subsections, it should be noted that the same six factors listed under Alternatives to the Undertaking for sewage systems also apply to water systems (see Part 2.1.3).

The following alternative actions may solve one or more of the general problems described:

1. Modify Operational Practices at the Water Treatment Plant

(a) Limit operating hours of noisy equipment to reduce sound level impacts on adjacent residents and uses

(b) Ensure that the operator of the water treatment plant is following proper procedures to adhere to the required degree of treatment

(c) Modify operational procedures at the water treatment plant by altering procedures for equipment operation and chemical addition

(d) Undertake training programs to upgrade the operator's understanding of treatment procedures and Ministry policies, guidelines and practices

(e) Modify operational procedures and/or processes to reduce the quantities of backwash wastewater or chemical sludge requiring disposal

2. Expand Maintenance Program

(a) Increased frequency of flushing-out and general cleaning of the distribution system may improve hydraulic capacity and water quality

(b) Undertake normal maintenance activities such as equipment overhaul and replacement of faulty or damaged parts, location and repair of faults causing contamination in the water distribution component

(c) Trace and monitor leakage in the water distribution system and undertake a program for its reduction/elimination

3. Reduce Water Demand

(a) Investigate a water conservation program to educate both the general public and industrial users of ways to reduce water usage

(b) Instigate the adoption of a municipal by-law directed to reducing water usage

(c) Install individual water meters at each point of water usage and charge on basis of volume used rather than flat fee

4. Obtain Water from Another Source

(a) Provide for extension of water mains from another municipality into that part of the community requiring additional supply

(b) Recommend that new development areas be serviced by individual or communal wells

(c) Abandon existing groundwater source and develop new water source and treatment at surface water source

5. Limit Community Growth

(a) Recommend that the municipality limit the ultimate extent and/or location of proposed residential, industrial and commercial growth

(b) Recommend that the municipality phase or schedule proposed growth in the community with respect to both location and implementation timing

6. Do Nothing

(a) In the Do Nothing Alternative, no improvements or changes would be made to solve the identified problem(s). This means that the problem(s) would still be present in the system. It does not necessarily mean, however, that no further development in the community would occur. The Ministry of the Environment has the responsibility of making recommendations on proposed developments but it is the Ministry of Housing (or the Regional Municipality) which grants the ultimate approvals.

Where an expansion and/or upgrading project in this Class is one of the alternative solutions considered, and is the recommended solution, the Do Nothing alternative will also be investigated. The Do Nothing alternative will be documented for Schedule C activities in the Environmental Study Report along with any other alternatives to the undertaking which were examined.

The Do Nothing alternative may be actually implemented at any time during the design process prior to the commencement of construction. A decision to Do Nothing would typically be made when the costs of all other alternatives, both financial and environmental, significantly outweigh the benefits.

2.2.4 Alternative Methods of Carrying Out the Undertaking

This section describes **the various ways** that could be considered for carrying out a specific expansion or upgrading project. These are referred to as the Alternative Methods of Carrying Out the Undertaking and differ from the Alternatives to the Undertaking in that the latter refer to **options which might be recommended instead** of an expansion or upgrading project in this Class.

For a specific expansion or upgrading project, the Alternative Methods of Carrying Out the Undertaking may comprise both alternative **design solutions** and alternative **construction solutions.**

In the following subsection, the typical alternative **design solutions** are grouped by the water system facility for which they would normally be considered. These facilities are:

1. Groundwater source facilities (wells)

2. Surface water source facilities (intakes)

3. Water treatment plant

4. High lift and booster pumping stations

5. Water distribution facilities (water mains and storage facilities)

When reviewing the subsections, it should be noted that the same five factors listed under Alternative Methods of Carrying Out the Undertaking for sewage systems also apply to water systems (see 2.1.4). Alternative construction solutions are also identical (see 2.1.5).

Alternative Design Solutions

1. Expand and/or Upgrade Groundwater Source Facilities

(a) Deepen the existing well(s)

(b) Increase pumping at existing wells

(c) Drill and develop new wells into existing or alternative groundwater source

(d) Artificially "recharge" the aquifer with surface water

2. Expand and/or Upgrade Surface Water Source, Source Facilities

(a) Replace intake pipe with pipe of improved design or larger diameter

(b) Duplicate existing intake pipe

(c) Extend intake pipe further into the water body

(d) Relocate existing intake pipe

(e) Modify intake crib

(f) Provide intake pipe with a liner to improve hydraulic capacity

(g) Undertake major repairs to and general cleaning of the intake pipe and crib

3. Expand and/or Upgrade Water Treatment Plant

(a) Enlarge key treatment components, e.g. flocculator, sedimentation basin, sand filtration

(b) Increase low lift pumping capacity by adding additional pumps and/or replacing pumps with improved design models

(c) Reduce sound levels by enclosing mechanical equipment and/or sound-insulating the existing buildings

(d) Add standby diesel generator and diesel fuel storage tank to provide standby power in case of power outages to ensure some water treatment and distribution

(e) Undertake extensive repairs to mechanical equipment of the water treatment plant

(f) Introduce design improvements/new technology to improve performance and efficiency of the water treatment plant

(g) Provide means of disposal for treatment wastes (e.g. connection to existing sewers, construction of holding ponds, mechanical dewatering, haulage to disposal sites)

4. Expand and/or Upgrade High Lift and Booster Pumping Station

(a) Replace existing pumps with new pumps of similar or improved design

(b) Construct new pumping station facility

(c) Add additional pumps to increase pumping capacity

(d) Undertake major repairs and renovations of pumping equipment

(e) Provide chemical treatment at the pumping station

(f) Add diesel generator to provide standby power in event of power outages

5. Extend and/or Upgrade Water Distribution Facilities

(a) Extend water mains to service new development areas

(b) Replace existing water mains with large diameter pipes or with mains of the same diameter but with superior hydraulic characteristics

(c) Provide new or additional water storage facilities

(d) Expand pumping capacity at high lift or booster pumping station (refer to subsection 4)

(e) Reline existing storage tank/reservoir

(f) Provide chemical treatment at the storage facility

(g) Undertake major repairs of water main and/or storage facility

(h) Reline existing water mains

2.3 Schedule A, B, and C Projects

Many activities may have insignificant environmental impacts, and it may not be justified to require these activities to undergo the full planning and documentation procedures for the Class EA. This section of the Class Document categorizes these activities and defines specifically the level of planning and documentation required.

Three categories of planning intensity have been developed. Activities in each category are presented in Schedules A, B, and C of Appendix II.

Schedule A activities have minimal adverse effects on the environment. These activities may be approved without further conditions and are not required to follow the full planning process of the Class EA. The level of planning and documentation is up to the proponent's discretion and there is no mandatory contact with other agencies.

Schedule B activities have the potential to adversely affect the environment. For these types of activities, the proponent is required to contact specific agencies and the public where certain components of the environment could be affected (see Appendix IV: Opportunities for Public and Government Agency Involvement in Planning). For example, if it is determined that the project will directly affect a watercourse, the proponent will be required to contact the District Office of MNR. If that agency has a concern that can not be resolved through discussions between the agency and the proponent, the concern could be sent by either party to the Minister of the Environment for resolution. If this concern is significant enough, then an individual Environmental Assessment could be required by the Minister via the bump-up procedure.

For the activities listed in Schedule B to be in compliance with the Class EA, there is mandatory contact with the public and affected agencies as per Appendix IV, but there is no mandatory requirement for an Environmental Study Report. The level of planning and documentation will be governed by the concerns raised during the mandatory contact. There is also an intermediate bump-up provision associated with these activities, as outlined in Schedule B of Appendix II and described in Part 6.3.

Schedule C activities have the potential to significantly adversely affect the environment. The full planning and documentation specified by the Class EA is required for these activities.

2.4 Operational Activities

The activity of operating a sewage or water facility is an action which may have the potential to significantly affect the environment and, as such, is an undertaking subject to the Environmental Assessment Act. An example of an operations activity having such potential is the impact of effluent discharge into receiving waters on the maintenance of a fisheries resource.

There are two categories of operations activities under the Class EA:

- operations activities at existing sewage and water facilities, which facilities did not need EA Act approval for their establishment; and
- operations activities at sewage and water facilities which facilities were, or are to be, established pursuant to individual or Class EA approval

R.R.O, 1980, Regulation 293, Section 4(1), as amended, provides an exemption from the EA Act for normal and emergency operation activities associated with facilities that did not need EA Act approval for their establishment. For the purpose of the Class EA, the term operation is defined to mean operating, maintaining and repairing where the purpose, use, capacity and location remain the same. The term "same purpose, use, capacity and location" means the objective and application remain unchanged; the volume, size, and capability do not result in a facility's capacity exceeding the existing rated capacity; and there is no substantial change in location. Existing rated capacity refers to the flow or volume of the sewage or water system as certified under the Ontario Water Resources Act and/or the Environmental Protection Act; or as implied in the plans and specifications that were submitted to obtain the above-mentioned certificates; or the current existing capacity, where no technical documentation exists.

The concept of substantial change in location must be defined on a case-by-case basis. If there is any doubt as to whether a change in location is or is not substantial, discussions will be held with the potentially affected government agencies and members of the public (see Appendix IV). The proponent will base all decisions on the question of significance upon the results of these discussions.

Operations activities at sewage and water facilities, which facilities were, or are to be, established pursuant to approvals under the EA Act (by individual or Class EA), are activities which are subject to the following requirements:

(a) The manner in which a sewage or water facility is to be operated will be considered as part of the planning for the establishment of the facility.

(b) Where an operations activity has the potential to adversely affect the environment, the individual EA or the ESR prepared under the Class EA must outline the planning process that recommended the proposed method of operation and planning which will be undertaken to refine the activity when it is instituted

(c) Where guidelines governing normal and emergency operations activities, such as operating manuals, have been developed, they will be referenced in the individual EA or ESR which is prepared for the establishment of the facility. Operations activities will be carried out in accordance with these manuals or guidelines.

(d) Where a sewage or water facility is already in existence and an operations activity is proposed which has not been discussed in the individual EA or ESR associated with the establishment of the facility, and which either does not meet the definition of the term operation given above, or is an activity within the definition of the term operation but which has the potential to significantly adversely affect the environment, that activity will be treated as a separate project and will be planned and implemented in accordance with the full planning and documentation requirements of the Class EA. If

there is any doubt as to whether a potential effect is or is not significant, discussions will be had with the appropriate government agencies and members of the public. The proponent will base all decisions on the question of significance upon the results of these discussions (see Appendix IV).

The following is a list of activities which are considered to fall within the definition of normal and emergency operation. While this is thought to contain most operational activities, this list should not be misconstrued to be all-inclusive.

- modify, repair, reconstruct existing facilities to provide operational, maintenance or other improvements such as: reducing odour; insulating of buildings to reduce noise levels and conserve energy; landscaping
- ongoing maintenance activities
- normal and emergency operation of sewage and water treatment facilities
- maintenance and/or minor improvements to grounds and structures
- addition of minor buildings, sheds and storage areas
- repairs, cleaning, renovation or replacement of a well or intake
- repairs, cleaning, renovation, replacement of water treatment plant and pumping station equipment or structure, storage facilities, distribution mains and appurtenances
- repairs, cleaning, renovation, or replacement of sewage treatment plant and pumping station equipment or structures
- repairs, cleaning, renovation or replacement of a sewage facility outfall
- installation of corrosion protection systems
- cleaning and/or relining existing collection system
- repairs, renovations or replacement of existing collection system and/or appurtenances
- cleaning, relining or replacement of existing mains
- installation of chemical or other process equipment and construction of associated facilities in existing pumping stations

2.5 Sludge Management Activities

The management of sludge is an action within the definition of the scope of the activities covered by the Class EA. The responsibility for sludge management activities is shared among various branches of MOE. The Waste Management Branch is responsible for the development of certain aspects of policies governing sludge utilization and sludge disposal. The responsibility for planning sludge management in association with a capital construction activity at a sewage facility generally rests with the Environmental Approvals and Project Engineering Branch of MOE. The responsibility for implementing sludge management activities on an ongoing basis generally rests with the Utility Operations Sections of MOE's six Regional Offices.

The requirements of the Class EA as they relate to sludge management activities are as follows:

Sludge Management Planning

Environmental Approvals and Project Engineering Branch will deal with the preferred method of sludge management and the optional methods of sludge management that are available for institution should the preferred method become unavailable, (i.e. sludge management contingency planning), as a part of the planning for the establishment of a sewage facility.

This planning will generally be on a broad scale. Where possible, the future tasks which the appropriate Utility Operations Section of MOE must fulfill in terms of actually implementing the preferred or a contingency sludge management procedure, (e.g., finding the actual sites for agricultural utilization or establishing landfilling operations for sludge disposal), will be documented in the ESR which is prepared on sludge. The ESR will typically outline the appropriate legislation and guidelines which establish procedures under which MOE's Regional Office will make and document sludge management planning decisions.

For example, the planning process for an expansion or upgrading of an existing sewage facility could take into account agricultural utilization as a solution to sludge management. In a general way, Environmental Approvals and Project Engineering Branch would determine whether enough sites meeting the requirements for agricultural utilization of sludge are within a reasonable distance from the sewage treatment facility. Environmental Approvals and Project Engineering Branch would discuss this planning and the fact that the Utility Operations Section of MOE's Region will be implementing the preferred sludge management solution utilizing the "Guidelines for Sewage Sludge Utilization on Agricultural Lands" in the ESR prepared by Environmental Approvals and Project Engineering Branch on the expansion or upgrading of the sewage facility.

A sludge management activity which has not been discussed in an individual EA or ESR on the establishment of a facility will be treated in the manner described in detail in the following pages.

A separate summary of the planning and documentation requirements for the alternative sludge management activities described below can be found in Appendix III and in the appropriate Schedules of Appendix II.

Sludge Utilization

Sludge can be managed through utilization as fertilizer supplement in agricultural operations. The "Guidelines for Sewage Sludge Utilization on Agricultural Lands" prepared by the Ministry of the Environment and the Ministry of Agriculture and Food, published April 1978, revised March 1981, established acceptable procedures for planning and implementing sludge management activities which will have minimal adverse effects on the environment. The sludge utilization program requires, among other things, the continuous addition of new agricultural fields to comply with the above noted Guidelines. Sludge management activities involving

agricultural utilization are considered to have minimal adverse effect on the environment where these activities are planned and implemented in accordance with these guidelines, as may be interpreted by MOE's Regional Offices in consultation with Waste Management Branch and the Sludge Guidelines Implementation Committee, as necessary. Therefore, at the proponent's discretion, the full planning and documentation requirements of the Class EA need not be followed for these types of sludge management activities. There is no mandatory contact, nor is there a bump-up provision associated with these types of activities. (See Schedule A, Appendix II.)

Sludge can also be utilized as fertilizer supplement on non-agricultural lands such as forest lands. Such activities have the potential to adversely affect the environment. Therefore, the proponent will be required to contact specific agencies and the public where certain components of the environment could be affected (see Appendix IV). The level of planning and documentation will be governed by the concerns raised during the mandatory contact. There is no mandatory requirement for an Environmental Study Report. There is, however, a bump-up provision associated with such activities, and this provision is outlined in Schedule B of Appendix II.

Storage of sludge is an integral part of the utilization of sludge on agricultural lands. If storage is provided at the treatment plant where the sludge is generated or at the soil conditioning site where the sludge is to be utilized, such activities are considered to have minimal adverse effect on the environment. For this reason, at the proponent's discretion, the full planning and documentation requirements of the Class EA need not be followed for these types of sludge management activities. There is no mandatory contact, nor is there a bump-up provision associated with these types of activities (see Schedule A, Appendix II).

*Sludge transfer lagoons/stations for the storage of sewage treatment plant sludges to be subsequently utilized on agricultural lands over an area not exceeding 50 ha for each annual sludge application, are activities which have the potential to adversely affect the environment. Therefore the proponent will be required to contact specific agencies and the public where certain components of the environment could be affected (see Appendix IV). The level of planning and documentation will be governed by the concerns raised during the mandatory contact. There is no mandatory requirement for an ESR. There is, however, a bump-up provision associated with these activities and this provision is outlined in Schedule B of Appendix II.

*Sludge transfer lagoons/stations for the storage of sewage treatment plant sludges to be subsequently utilized on agricultural lands over an area exceeding 50 ha for each annual sludge application are activities which have the potential to significantly adversely affect the environment and will be subject to the full planning and documentation requirements of the Class EA (see Schedule C, Appendix II).

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* Changes to the Legislation related to sludge handling are being proposed as a result of MOE public consultation process, documented in the Blue Print for Waste Management in Ontario. Proponents of sludge transfer lagoons/stations are advised to determine the status of the proposed changes to the Legislation before entering upon the MOE Class EA planning process.

Sludge Disposal

Sludge can be managed through disposal activities such as landfilling or incineration.

The activity of disposing of sludge at existing landfill or incineration sites which are certified under the Environmental Protection Act for sludge disposal at the time of the proposal to landfill or incinerate is an activity which will have minimal adverse effects on the environment. Therefore, at the proponent's discretion, the full planning and documentation requirements of the Class EA need not be followed for these types of sludge management activities. There is no mandatory contact, nor is there a bump-up provision associated with these types of activities (see Schedule A, Appendix II).

The activity of disposing of sludge at existing landfill or incineration sites which are not certified under the Environmental Protection Act for sludge disposal at the time of the proposal to landfill or incinerate is an activity which has the potential to adversely affect the environment. The determination of the significance of such effects must be based on consultation with potentially affected government agencies and members of the public. Therefore, the proponent will be required to contact specific agencies and the public where certain components of the environment could be affected (see Appendix IV). The level of planning and documentation will be governed by the concerns raised during the mandatory contact. There is no mandatory requirement for an ESR. There is, however, a bump-up provision associated with these activities, and this provision is outlined in Schedule B of Appendix II.

The activity of disposing of sludge through the establishment of new landfill sites or new incineration sites is an activity which has the potential to significantly adversely affect the environment and is subject to the full planning and documentation requirements of the Class EA (see Schedule C, Appendix II).

The Province is in the process of developing guidelines which will establish planning and implementation procedures governing landfilling activities. These guidelines are still in a draft form and until they have been formally adopted, the requirements of the Class EA must govern sludge landfilling activities. When acceptable guidelines are formally adopted, it is anticipated that the Class EA will be reviewed for possible amendment respecting the treatment of this activity.

Other Sludge Management Activities

It may be necessary to institute sludge management procedures in order to treat and handle sludge in association with other utilization or disposal operations. Such sludge management activities may take the form of additional sludge treatment facilities such as sludge drying beds, composting operations for agricultural or silvicultural use or incorporation as top dressing into mine tailings sites and landfill sites.

Such sludge management activities, if carried out at the particular treatment plant where the sludge is generated or at existing landfill or incineration sites where the sludge is to be disposed of, which sites are certified under the Environmental Protection Act for the type of sludge management activity proposed, are activities which will have minimal adverse effects on the environment. Therefore, at the proponent's discretion, the full planning and documentation requirements of the Class EA need not be followed for these types of sludge management activities. There is no mandatory contact, nor is there a bump-up provision associated with these types of activities (see Schedule A, Appendix II).

Sludge management activities carried out at a treatment plant where all of the sludge to be managed was not generated (e.g., a central composting operation servicing a number of plants), or at existing landfill or incineration sites where the sludge is to be disposed of, which sites are not presently certified under the Environmental Protection Act for the type of sludge management activity proposed, are activities which have the potential to adversely affect the environment. Therefore, the proponent will be required to contact specific agencies and the public where certain components of the environment could be affected (see Appendix IV). The level of planning and documentation will be governed by the concerns raised during the mandatory contact. There is no mandatory requirement for an ESR. There is, however, a bump-up provision associated with these activities, and this provision is outlined in Schedule B of Appendix II.

Sludge management activities involving situations other than those described above (e.g. sludge drying beds not located at the sewage treatment plant or at the final site of sludge disposal/composting sites), are activities which have the potential to significantly adversely affect the environment and are subject to the full planning and documentation requirements of the Class EA.

The Province is in the process of developing guidelines which will establish planning and implementation procedures governing sludge composting activities. These guidelines are still in a draft form and until they have been formally adopted, the requirements of the Class EA must govern sludge composting activities. As with landfilling activities, these requirements will be reviewed once the formal composting guidelines are in place.

2.6 Retirement of Facilities

Certain facilities may become redundant or inefficient, or the nature of ownership or operation of facilities may become inefficient to the extent that MOE may elect to retire the facility. Retirement may involve simply relinquishing rights, such as operating responsibilities to a second party, or may involve actions such as decommissioning plants, demolishing structures and selling property.

Activities involving the retirement of a sewage or water facility are actions which have the potential to significantly affect the environment and are undertakings subject to the EA Act. An example of a retirement activity having such a potential would be the demolition of a structure, such as a water treatment plant, which is of significant historical, architectural value. A second example would be the decision to retire a sewage or water facility where the abandonment would leave former customers without service.

Two categories of retirement activities which require discussion for purposes of clarifying their status under the Class EA are:

- retirement activities at existing sewage and water facilities, which facilities did not need EA Act approval for their establishment; and
- retirement activities at sewage and water facilities which facilities were, or are going to be, established pursuant to individual or Class EA approval

R.R.O. 1980, Regulation 293, Section 4(1) provides an exemption from the EA Act for the activity of retiring a facility that did not need EA Act approval for its establishment.

Retirement activities at sewage and water facilities, which facilities were, or are to be, established pursuant to approvals under the EA Act are subject to the following requirements:

(a) Wherever possible, the end use of a sewage or water facility will be anticipated so that retirement activities can be identified in a general sense at the time the facility is being established. In this way, the facility can be designed to reflect any long-term intentions respecting future operations or uses that are to be made of the site. This planning will be described in the individual EA or ESR prepared on the establishment of the facility.

(b) Where the establishment of a sewage or water facility has the effect of rendering a second facility redundant, the planning related to the retirement of the second facility will be discussed in the individual EA or ESR that is prepared on the establishment of the first facility.

(c) Where a retirement activity, which has the potential to significantly adversely affect the environment, is proposed as an isolated incident at an existing sewage or water facility, which is not the result of the establishment of a related sewage or water facility, and has not been discussed in the individual EA or ESR associated with the establishment of the facility, the retirement activity will be considered as being a separate project and will be planned and implemented in accordance with the full planning and documentation of the Class EA.

(d) Retirement activities which merely involve the disposition of rights to facilities, such as relinquishment of operating responsibilities, can be completed without complying with the full planning and documentation requirements of the Class EA on the condition that the party assuming responsibility for the facilities continues to operate the facilities in the same manner that the facilities have been operated in the past. Where the second party proposes to change the manner of operation, MOE will not complete the retirement activity until MOE has established that the proposed change in operation is in compliance with the EA Act. Compliance with the EA Act will be established pursuant to the treatment of operations activities as described in Section 2.4 above.

2.7 Co-Proponency

It is sometimes the case that more than one jurisdiction has responsibility over aspects of a sewage or water facility. For example, the Province, through the Ministry of the Environment, might own and operate a sewage treatment plant while the municipality in which the plant was located might own the sewage collection system associated with the plant.

Where a project is proposed to be carried out in connection with such a facility, in terms of the Environmental Assessment Act, it is not desirable to have to similar but separate Environmental Assessment procedures apply. Therefore, the parties should choose which procedures to follow, being guided by the following principals:

> The proponent of the project will be considered as being the applicant. The applicant is the party who is primarily responsible for the project. The project will be subject to any applicable Environmental Assessments for which the applicant has received approval under the EA Act. The project will not be subject to any Class Environmental Assessments which might apply to that portion of the project over which the applicant does not have direct jurisdiction.

For example, where a municipality wishes to provide treatment capacity for future growth and this requires the expansion of an MOE sewage treatment plant and MOE is expected to continue to operate the expanded facility, the municipality would normally be considered as being the applicant. For purposes of the Act, the municipality would be the proponent of the project. The project would be subject to the requirements such as the "Class Environmental Assessment for Municipal Sewage and Water Projects". The project would then not have to comply with the requirements of the MOE Class EA.

Each party should consult the other at an early stage to determine which procedures should be followed. This determination shall be reflected in any notices and documentation which is made pursuant to the requirements of the particular Class EA which has been chosen to govern the project.

2.8 Individual Environmental Assessments

If it is found that a project in this Class has associated with it severe environmental condition changes, it may be appropriate to carry out an individual Environmental Assessment.

The circumstances which would lead to such a decision are not considered to be necessarily related to such factors as the cost or size of a project in this Class. For example, such a decision may be required when:

a. The history of the problem(s) associated with the existing sewage or water system suggests that potential environmental impacts are extensive, environmental features are very sensitive or that the social or financial implications of solving the problem(s) are controversial.

b. Preliminary work on or public reaction to a proposed expansion and/or upgrading project suggests that potential environmental impacts are more significant, environmental features are more sensitive or the social and financial implications more controversial than originally assumed.

c. The remedial measures proposed to mitigate adverse environmental condition changes are not considered appropriate, adequate or extensive enough to resolve concerns expressed.

The mechanism for requiring an individual Environmental Assessment to be carried out for a project in this Class will be one of the following:

1. The proponent, as advised by the Regional Director, would notify the Environmental Assessment Branch of its intent to carry out an individual Environmental Assessment for a project in this Class.

   Generally this decision would be based on recognition early in the design process of sensitivities associated with the project. However, any individual, public group, or government agency may bring its concerns to the attention of the proponent at any time from inception of the design process until 30 days after submission of the Environmental Study Report or 30 days after notification of a Schedule B provision and request that an individual Environmental Assessment be prepared.

2. The Minister of the Environment may direct the proponent to prepare an individual environmental assessment. In this regard, any individual, public group or government agency may bring its concerns to the attention of the Minister at any time from inception of the design process until 30 days after submission of the Environmental Study Report or 30 days after notification of a Schedule B provision and request that an individual Environmental Assessment be prepared.

See Section 6.3 for bump-up procedures.

3.0 PLANNING AND DESIGN PROCESS

3.1 Introduction

This part of the document explains how MOE will ensure that the requirements of The Environmental Assessment Act are fulfilled in the design and construction of projects in this Class. The five stages of the design process are explained; the involvement of the public, other government agencies and the Environmental Assessment Branch in these activities is described; and methods for provision for review of the project are summarized.

3.2 The Planning and Design Process

There are five stages in the design process: Problem Identification, Alternatives to the Undertaking, Alternative Methods of Carrying Out the Undertaking, the Environmental Study Report, and Implementation. A flow chart of the design process is provided in Figure 1. The five stages are generally described below, and then in more detail in the following subsections.

Stage 1 - This stage begins with the identification of the problems to be solved or needs to be met, and usually concludes with the selection of a consultant to carry out the necessary studies.

Stage 2 - Alternatives to the Undertaking are identified and evaluated for their potential environmental impact. A preferred alternative is selected and the proponent decides on what actions must be taken to conform with the Environmental Assessment Act.

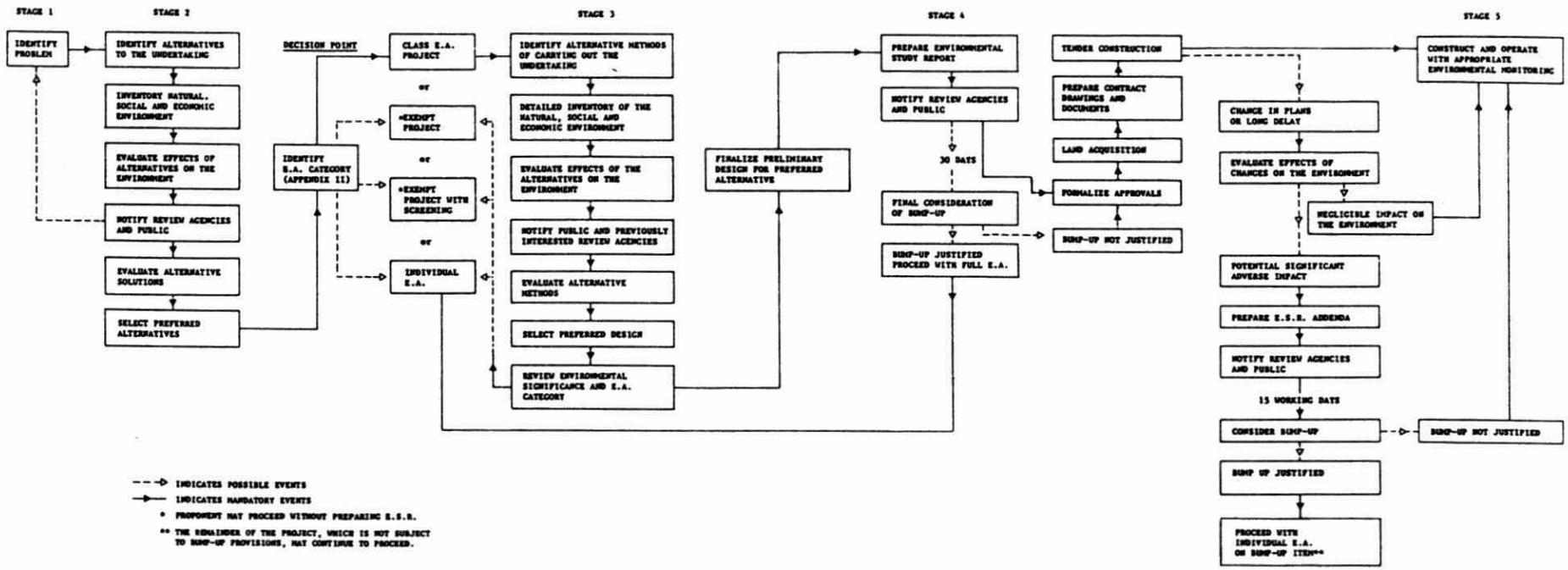
Stage 3 - Alternative Methods of Carrying Out the Undertaking are identified and evaluated and the preferred alternative is selected.

Stage 4 - The Environmental Study Report is prepared to document the planning procedure for Schedule C activities. It is made available for review to other agencies and the public for final consideration of bump-up for the complete project.

If no bump-up request is received, approvals are formalized, land acquisition commenced, financing arranged. Detailed design and construction specifications are prepared culminating in the award of contract(s) after public tender.

Stage 5 - During construction, monitoring will be conducted to ensure adherence to the environmental provisions in the specifications and the ESR. In certain cases, operation of the completed facility will also be monitored.

FIGURE 1 : PLANNING AND DESIGN FOR CLASS E.A. PROJECTS



3.2.1 Problem Identification (Stage 1)

Projects will be undertaken only in response to certain identified deficiencies such as poor effluent or water quality; inadequate pressure or flow for peak demands or fire protection; increased demand in a developing area; high operating or maintenance costs, etc. The identification of the problem will probably be by either a municipality or a Regional Office of MOE.

Under the Act, it is necessary to document all factors which lead to the conclusion that improvement is needed. MOE will review the needs identified by the Regional Office or municipality and evaluate the need for improvement using the Ministry's MBR (Management by Results) rating system. In this system, scores are assigned for such objectives as:

- the removal of health hazards
- environmental protection
- accommodation of planned development in the municipality
- community enhancement
- water quality objectives

The MBR rating system is used to determine whether or not to proceed with further investigations (a minimum total score must be achieved) and to assign priorities for various investigations for improved sewage and/or water service.

At this time, if the need for the project has been established, and the problem was identified by a municipality, meetings with the municipality should be held to determine which agency will act as proponent of the undertaking (see Part 2.7, Co-Proponency). If MOE is the proponent, guidelines presented in this Class EA are followed; if a municipality is the proponent, the municipality undertakes the EA under the Municipal Engineers Association (MEA) Class EA for Municipal Sewage and Water Projects.

3.2.2 Alternatives to the Undertaking (Stage 2)

The Environmental Assessment Act stipulates that a comprehensive review procedure be followed when evaluating alternative solutions to the problem(s) that have been identified. Social, economic, political, physical and environmental constraints and benefits must be considered. This will involve:

1. Identification of alternatives to solve the problem(s). For sewage systems, refer to Part 2.1.3 of this document; for water systems, see Part 2.2.3.

   It should be noted that maintenance, operation and retirement activities are considered as part of the undertaking for the purposes of the identification and analysis of alternatives and their environmental effects.

If all the alternatives identified are listed in Schedule A of Appendix II, the proponent need proceed no further in Stage 2 of the planning process. The proponent will follow Stage 2 for Schedule B and C activities.

2. Preparation of a physical description of the site where the project is to occur, and an inventory of the natural, social and economic factors which are to be considered when reviewing the effects of the project. In some cases, it may be necessary to consider alternative locations for the project. See Part 4 and Appendix V for descriptions of typical environments and potential environmental effects of undertakings in this Class.

3. Identification of the magnitude of the positive and negative effects of each alternative with respect to all natural, social and economic factors.

4. Notification of review agencies and the public to solicit input. By making all interested parties aware of the problem, the area where the problem exists, and potential solutions to the problem, certain other pertinent factors may come to light. Review agencies and individuals to be contacted, unless it can be concluded that they have no initial interest in the project, include:

   a) affected municipalities*
   b) property owners adjacent to the project site*
   c) MOE District or Regional Office*
   d) Ministry of Agriculture and Food (County Agriculture Representative)
   e) Ministry of Community and Social Services
   f) Ministry of Citizenship and Culture (Regional Archaeologist)
   g) Ministry of Health (Local Health Office, Medical Officer of Health)
   h) Ministry of Municipal Affairs and Housing
   i) Ministry of Industry and Tourism
   j) Ministry of Natural Resources (District Manager)
   k) Ministry of Northern Affairs
   l) Ministry of Transportation and Communications (District Office)
   m) Conservation Authority
   n) Niagara Escarpment Commission
   o) Ontario Hydro
   p) Ministry of Energy (Biomass/Energy from Waste Section, Energy Conservation Group)

   Parts 3.3, 3.4, 3.5 and 6.1 and Appendix IV give more detailed information on the involvement of the public, other ministries, and other branches of MOE.

   Methods of contacting the public include individual notification, newspaper advertisements or public notices. It is important to note that only those government agencies expressing an interest in the project at this point will be contacted later on in the study process. However, input from the general public will be solicited again in Stage 3 when alternative designs are considered.

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*To be contacted in all situations.

5. Evaluation of identified possible solutions, taking into account environmental and other factors, and selection of a preferred alternative.

The above process may not necessarily follow in sequence. The results of one step may necessitate the repetition of previous steps. For instance, contact with the public and external review agencies may require evaluation of factors not previously identified. Similarly, the economic situation may change so that the entire project must be re-assessed. The proponent need only gather and document that information which is likely to have a direct bearing on impacts and mitigative measures. The level of detail of information should reflect the potential severity of the predicted impacts.

After completion of Stage 2, the proponent will decide on the planning requirements for the preferred alternative to solve the identified problems. This will be determined by consulting Schedules A, B and C in Appendix II and Parts 2.3 and 2.8 of the report. The project will either be exempt from the Class EA planning process (Schedule A Activities); require screening by review agencies, but no ESR (Schedule B activities); be subject to the full requirements of the Class EA Document (Schedule C activities); or require an individual Environmental Assessment (Part 2.8)

Exempt projects (Schedule A activities) may be developed immediately, subject to the requirements of any other statutes having application, such as the Ontario Water Resources Act or the Environmental Protection Act.

If the project is exempt subject to the screening process (Schedule B activities), then the contacts described in the screening criteria must be made prior to the project being undertaken. In this regard notification of a Schedule B provision is given to affected agencies and the public. This notification starts the 30-day review period, which is the last opportunity for bump-up for Schedule B projects. No ESR is required for this type of project.

If the project is to be subject to the full requirements of the Class EA document (Schedule C activity), then the full planning and documentation steps outlined in the Class EA should be followed, i.e. an ESR is to be prepared.

The parties who have expressed an interest in the decisions which are being made on a project may be informed of the conclusions which are reached at the end of Stage 2 (Schedule A and C activities optional; Schedule B activities mandatory).

3.2.3 Alternative Methods of Carrying Out the Undertaking (Stage 3)

Stage 3 is similar in scope to Stage 2, except that alternative methods of implementing the preferred solution are being evaluated as opposed to considering alternative solutions. This will include:

1. Identification of alternative design concepts for the preferred solution. For alternative methods of carrying out the undertaking, see Part 2.1.4 for sewage treatment systems and Part 2.2.4 for water supply systems. Again, maintenance, operations and retirement activities must be considered in the planning process.

2. Preparation of a detailed inventory of the natural, social and economic factors which are to be considered when reviewing the effects of the project. See Part 4 and Appendix V for descriptions of typical environmental and potential environmental effects of undertakings in this Class.

   Rather than dealing with the general environment of the area, the particular components of the environment which must be considered and compared with each other will be identified in detail. However, this needs only to be carried out to the extent necessary to select a preferred design.

3. Identification of the magnitude of the positive and negative effects of each alternative with respect to all natural, social and economic factors. This will establish a basis for comparison of the alternative design concepts.

4. Input from the general public and previously interested review agencies will again be solicited. Contact with the public is not limited to those who previously expressed interest, as many may not get involved until the location is known and a decision is imminent. The public and interested agencies are advised that a preferred solution has been selected and are given the more pertinent details. It may be of advantage to point out that the preferred solution was selected only after serious consideration of all environmental factors and previous input from the public and other agencies. A draft ESR could also be used as a source of public information.

5. After identifying all environmental factors which may be impacted, determining mitigative measures essential to minimize impacts (see Appendix VI), and considering public and government input, the proponent may now:

   a) select a preferred design concept for final design and construction, or
   b) review the environmental significance of the preferred concept to determine whether it is: exempt; exempt with screening; subject to the Class EA; or subject to full EA procedures.

3.2.4 Environmental Study Report (Schedule C Activities Only)

Stage 4 is the culmination of the procedures followed during planning and design for compliance with the Environmental Assessment Act. An Environmental Study Report (ESR) is prepared which documents the planning and decision-making process which has been followed, and the mitigating measures and monitoring procedures that will be undertaken. In order to speed up the planning process, the ESR may be prepared concurrently with Stages 1 through 3.

Any Schedule B activity which has been bumped-up to Schedule C status prior to the termination of the 30 day period, will have an ESR prepared to document its planning design.

In general, the ESR will document:

1) the problem, the need for a solution, and any other relevant background information
2) the planning process employed in selecting the preferred alternative to the problem(s), including trade-offs made and all information upon which the decision was made
3) the planning process employed in selecting the preferred alternative methods of carrying out the preferred alternative, including trade-offs made and all information upon which the decision was made
4) the involvement of review agencies and the public
5) all environmental considerations
6) mitigating measures which will be undertaken during and after construction to minimize environmental impacts (see Appendix VI)
7) any special provisions, contract specifications, operations procedures, or special design features necessary to protect the environment. These must be included in the construction specifications or operating manuals so that they become the responsibility of the contractor and those who will operate and inspect the facility.
8) guidelines for operating, maintaining and retiring the facility
9) monitoring programs which will be carried out during construction and operation

Part 5 of this document describes the requirements for completing the ESR in more detail.

The ESR is distributed to various MOE Branch personnel and Sections, the Regional Office, and potentially to other MOE branches which may be involved in the review. Once the ESR receives internal approval, it is forwarded and placed on file for public review at the appropriate Region Office and the municipal office. Copies are also sent to any external agency or member of the public who requests one in writing.

If objections result within the public review period, the proponent should attempt to resolve the problem with the objector. If this fails, however, it then becomes the responsibility of the Minister of the Environment to decide whether the objection is justified and whether the project should be amended or bumped-up to require a full Environmental Assessment. The document is maintained on public record file for a year after project implementation.

If there are no objections to the ESR from the public or other agencies, the project may proceed. It is only at this period that final contract drawings, and documents are prepared and the necessary approvals formalized. Land acquisition may not take place until after the 30 day review period of the ESR has lapsed (37 days after the mailing of the notice, where notice is given by prepaid mail).

Because of public response it may be necessary to prepare an addendum to the ESR. Procedures for preparing addenda are presented in Part 5.3. Copies of the addendum are sent to all parties who received copies of the full Environmental Study Report. Land acquisition and construction may not proceed until revisions and addenda to the ESR are approved.

After approval of the ESR, external approvals may be obtained from the municipality, Central Mortgage and Housing Corporation, the Ontario Municipal Board, etc. and any other permits or licenses required may be requested. Tenders may be let and the project may proceed into Stage 5.

3.2.5 Implementation

This phase involves the actual construction of the project according to the contract specifications and the limitations imposed by the ESR. The ESR will point out the expected impacts of the project on the environment and the mitigating measures required to eliminate or minimize these effects.

The contractor is required to implement remedial measures set forth in the ESR and incorporated into the construction specifications. As a matter of standard practice, the Ministry of the Environment guidelines set forth in the document entitled "Environmental Considerations for the Planning and Construction of Provincial Sewer and Water Projects" will be followed (see Appendix VII).

It is necessary for the proponent to closely monitor construction and, in some cases, operation to ensure that recommended mitigating measures take place. Major, complex projects may take several years to design, construct and put into operation. Such projects will require monitoring during construction and may also demand ongoing monitoring as part of the day-to-day operation of the facility. Ongoing monitoring may in some circumstances become a permanent operating procedure throughout the lifetime of the facility. In other cases, it may be necessary to require monitoring during operation for limited periods only, sufficient to determine whether design predictions have been achieved and commitments met. Projects with minor or less significant impact on the environment may require little or no monitoring beyond the routine enforcement of standard construction activity specifications.

In all cases, the ESR will define the objectives of the monitoring program and will document specific requirements for monitoring, appropriate to the particular circumstances and conditions in which the project will be constructed.

In addition to monitoring construction and operation activities, the effectiveness of the ESR in predicting environmental impacts and fulfilling the Class EA requirements should be monitored. More details on monitoring activities are presented in Parts 5.4 and 6.5.

3.3 Involvement of the Public

The purpose of providing opportunities for the public to participate in planning is to allow for the exchange of ideas between the proponent and those parties having the potential to be affected by the undertaking. Such an exchange will help to avoid controversy while broadening the information base in order to better facilitate good decision making. The solicitation of input from the public should be an ongoing exercise throughout the planning of the project. To ensure that the concerns of those potentially affected by an undertaking are identified for consideration at the point in time where input can be most effective, certain mandatory points of contact are built into the planning requirements of the Class EA. These points of contact are set out in Part 3.3.1 below.

3.3.1 Mandatory Contacts

It is necessary that there be certain mandatory contacts made with the public in order to ensure that input can be considered at the most effective point in a project's planning. The points where contact will be made are as follows:

1. During the Alternatives to the Undertaking Stage (Stage 2)

2. During the Alternative Methods of Carrying Out the Undertaking Stage (Stage 3)

3. At the time of submission of an Environmental Study Report (Stage 4)

4. At the time of submission of a Revision to an Environmental Study Report

Obviously all four opportunities for contact will not exist for every project that might be planned under the Class EA. Contact number 4 will only be made in the event that a significant change is proposed in a project that has already been planned. Therefore, for the majority of projects, mandatory contact will be made during Stages 2 and 3 and, depending upon the response to this contact, at the time of submission of the Environmental Study Report.

MOE will ensure that contacts are made far enough in advance so as to provide the parties being contacted with an adequate opportunity to review the planning documentation that has been compiled to that point. The length of time to be provided will be based upon the scope of the project, the complexity of the planning documentation, the urgency of the need to solve the problem at hand, and the desires, in terms of review time, of the various members of the public who wish to be involved in planning. (For methods of public involvement refer to Section 6.1.)

No minimum review periods are specified for contacts numbers 1 and 2. However, MOE will ensure that those who expressed a specific desire to remain involved in planning or who have the potential to be affected by any activity but have not been previously contacted, are contacted when notice is given of a Schedule B provision or at the time of submission of an ESR to the public record file. Timing for this contact will provide parties with at least thirty days to review the submission. MOE will not act to establish the undertaking (e.g. acquire property) prior to the termination of the thirty-day period. Unless a longer period is provided for in the notice, anyone wishing to make a submission will have to ensure that it is received by MOE not later than 30 days after notice is given (37 days after the mailing of the notice, where notice is given by prepaid mail).

Where an addendum to an ESR is necessary, MOE will contact all parties having the potential to be affected by the proposed changes to the project. Timing for this contact will provide parties with at least five working days to review the addendum. MOE will not act to establish any component of the project which is affected by the subject of the addendum prior to the termination of the five working day period. Unless a longer period is provided for in the notice, anyone wishing to make a submission will have to ensure that it is received by MOE not later than 7 days after notice is given (14 days after mailing of the notice, where notice is given by prepaid mail).

Appendix IV outlines the situations in which particular government agencies and members of the public will be contacted.

Where the proponent is of the opinion that because the persons who are to be given any notices are so numerous, or for any other reason it is impractical to give the notice to all or any of the persons individually, the proponent may instead of doing so, cause the notice to be given to the persons by public advertisement or otherwise as the proponent may direct, and the date on which such notice is first published or otherwise given as directed shall be deemed to be the date on which the notice is given.

In the event that a project is being proposed in response to an emergency, MOE may elect to shorten the thirty and fifteen day review periods referenced above. The periods may also be shortened if MOE obtains a consent to do so from all persons having the potential to be affected by the project.

3.4 Involvement of Other Agencies

It is essential that other agencies are involved early in the planning process. This ensures that all their concerns are recognized at the outset and that any constraints that may be placed on the project can be identified before extensive planning takes place.

Other agencies may identify concerns that may place the entire project in jeopardy or cause lengthy delays. For example, if the Ministry of Citizenship and Culture indicates that the location selected for the project is a known archaeological site, it may be necessary to find an alternative location or to salvage all of the artifacts prior to implementing the project. Analysis of heritage and other resources may require lengthy analysis and mitigating measures. Consequently, the earlier the proponent is aware of concerns, the sooner the required inventory and analysis may be completed.

In some cases, another agency may identify an environmental concern of such significance that an individual Environmental Assessment will be required, or the concern may be of such magnitude that the need for the undertaking will have to be re-assessed in light of the new information. It is to the proponent's advantage to be aware of other agency concerns as soon as possible.

When contacting a government agency or interest group, information about the demonstrated need for the project and probable scope and location is presented. This information is usually sent in a letter directly to the contact person in charge of reviewing environmental documents. For agencies having such a contact person, this ensures close liaison and prompt response.

As with individual members of the public, agencies are informed of the relationship of the planning exercise to the EA Act, the Class EA procedures being followed, mechanisms of bumping-up the project to individual EA status, and future points of contact (refer to Section 6.1).

The mandatory points of contact are as follows:

1. During the Alternatives to the Undertaking Stage (Stage 2)
2. During the Alternative Methods of Carrying Out the Undertaking Stage (Stage 3)
3. At the time of submission of an Environmental Study Report (Stage 4)
4. At the time of submission of a Revision to an Environmental Study Report

After the initial contact with other agencies, it is only mandatory to keep those agencies informed who originally expressed interest in the undertaking. An agency expressing no concern would only be contacted again if changes to the undertaking are made which may impact the environment under its mandate (see Appendix IV).

Copies of Environmental Study Reports are made available to individual review agencies upon written request, if they have provided input to the planning process. Review times for agencies are identical to those for the general public (30 days for the ESR and 5 working days for revisions to the ESR).

3.5 Involvement of the Environmental Assessment Branch

There will be two types of contact with representatives of the Environmental Assessment Branch with respect to the provisions of this Class Environmental Assessment document, namely:

- contacts to request specific environmental information (optional and undertaken where appropriate)
- contacts to submit the Environmental Study Report for projects which are the subject of a bump-up request (mandatory)

1. Optional Contacts

The liaison representative of the Environmental Assessment Branch may be requested to assist with identifying potential information sources at any of the following steps:

- while determining the need for the undertaking
- while considering alternatives to the undertaking
- when preliminary designs are being considered

2. Mandatory Contacts

A copy of all Environmental Study Reports prepared for projects which are the subject of a bump-up request shall be submitted to the Environmental Assessment Branch immediately upon the proponent becoming aware of the bump-up request.

A copy of any other Environmental Study Report shall be forwarded to the Environmental Assessment Branch upon written request.

If, at any time during the planning process, the proponent decides that a project may have severe adverse environmental impacts, he will notify the Environmental Assessment Branch that an Individual Environmental Assessment may be conducted.

See Sections 2.8 (Individual Environmental Assessments), 6.2 (Document Availability) and 6.3 (Bump-up Procedures).

3.6 Provision for Review of the Project

In some cases, a significant time lapse may occur between the completion of the ESR and the actual implementation of the project. A review of the preferred design solution is carried out in such instances to ensure that the technical aspects of the design and the environmental protection measures are still valid. Where modifications of the environmental protection measures are considered, these revisions will be reviewed to assess the implications of the proposed changes.

If the entire project, or portions of the project, constitute a significant deviation from the original design or manner of implementation, it may be necessary to prepare an addendum to the ESR. See Section 5.3 for procedures for revising a project or preparing addenda.

4.0 THE ENVIRONMENT AFFECTED

4.1 Description of Typical Environments

The nature of a Class EA is such that it applies to numerous projects that could be carried out in any part of Ontario. A description of every component of the environment that might be encountered therefore is impractical. In order help the reader in understanding the types of environment that could be affected, a series of environmental settings have been described. These are set out below under the basic headings of Rural and Urban.

Although these descriptions are general, the proponent will be required to describe the environment to be affected by a specific project in detail in the Environmental Study Report (Schedule C projects only). Review agencies and the public will therefore have an opportunity to understand the specific environment affected by a given project while it is being planned.

4.1.1 Rural Settings

Typical examples of environmental settings occurring in the rural Ontario landscape are as follows:

1. Stable Agricultural Areas

- agriculture is the predominant land use; usually prime or high class farmland
- Official Plan designates the area as agricultural area zoned for existing agricultural use
- adjacent area is relatively free from significant development pressures; there are no large urban areas in the immediate vicinity
- rural community, relatively stable social conditions
- very scattered commercial or residential land use along the highway; some rural concentrations (e.g., hamlets)
- field entrances, active farming is commonplace along the existing highway

2. Pressured Agricultural Areas

- agriculture is the main land use at present, usually a predominance of high class farmland
- farmland is under considerable pressure for non-agricultural development, e.g. residential
- commercial and residential land uses occur regularly along the existing highway
- properties are zoned for non-agricultural uses
- much of the agricultural land, especially adjacent to the existing highway, is under speculative control

3. Recreational Areas

- land use is a mixture of natural open space, recreational uses, and scattered farming
- farmland is usually not prime quality and much pasture and meadow exists
- intensive recreation uses, such as cottage development and tourism are significant in or around the area
- scattered commercial, industrial and pockets of residential land use exist along the highway
- some Crown land and much forested natural open space

4. Undeveloped Areas

- undeveloped landscape, in a relative sense; a predominance of trees, surface water, scrubland, etc.
- much of the land is Crown land
- socio-economic structure relatively stable; very dependent on natural resources and resource-based extensive recreation uses (canoeing, hunting, fishing, scattered cottage use, etc.)
- scattered commercial and residential land uses along the highway, often occurring in small clusters

5. Commercial, Institutional and Industrial Areas

- primary land use is commercial, institutional or industrial
- the appropriate zoning exists and the appropriate development exists or is imminent

4.1.2 Urban Settings

Urban areas vary not only in function but also in physical layout. For example, the approaches to an urban area may be characterized by strip development, or by the presence of industry. More than one environmental setting may appear in an urban area.

Typical examples of environmental settings occurring in the urban Ontario landscape are as follows:

1. Stable Residential Areas

- primary land use is residential
- Official Plan (if existing) designates the area as residential zoned for existing residential use
- free from redevelopment pressures
- adjacent areas relatively free from development pressures

2. Pressured Residential Areas

- primary land use at present is residential
- relatively high percentage of tenant-occupied residences
- adjacent areas are, or are becoming, non-residential
- there may be pressures to revise the Official Plan, if one exists, to allow redevelopment to higher densities, commercial use, or both
- properties are zoned for more intensive residential use and/or non-residential use

3. Recreational Areas

- land use is a mixture of open space; recreational uses such as swimming pools, playing fields, arenas, etc.; and possibly scattered residential buildings
- in some cases a lake/stream/marina/beach/cottaging area may be adjacent to the facility, or nearby, and tourism may therefore be significant in or around the area
- scattered pockets of commercial and/or industrial land uses may exist
- recreational parks

4. Institutional Area

- primary land use is institutional

5. Commercial Areas

- primary land use is commercial
- zoning is commercial and commercial development exists or is imminent

6. Industrial Areas

- primary land use is industrial
- zoning is industrial and industrial development exists or is imminent

4.2 Potential Environmental Effects

The purpose of this section is to alert the proponent to the types of impacts that an undertaking in this Class may have on the environment. It is important to note that the environment, as defined under The Environmental Assessment Act, includes not only natural features, but also physical, historic, social and economic features.

Any undertaking may have a myriad of effects on the environment. Typical changes that may be expected due to certain activities are generally described below and presented in tabular form in Appendix V. An indication in the tables that a change in the environment may occur does not necessarily mean that the effect is negative; many activities will have a positive impact on the environment.

Because the Class document groups a number of activities and facilities together, the discussion of potential environmental effects is necessarily general. Detailed environmental effects of each undertaking must be identified and evaluated in the Environmental Study Report.

4.2.1 The Physical Environment

A number of parameters must be considered when evaluating the impacts of an undertaking on the physical environment. In general, these include:

1) changes in quantity, quality or direction of surface water drainage
2) changes in quantity and quality of groundwater
3) changes in soil characteristics and soil erosion
4) changes in geological or topographical features
5) changes in the climate

Changes in the physical environment may also impact the natural environment, land use, aesthetics, historic and archeological sites, and have the potential to disrupt the adjacent community.

4.2.2 The Natural Environment

Vegetation, fish and wildlife are considered under this component of the environment. The term wildlife is used in its broadest sense and may include mammals, birds, reptiles, amphibians and invertebrates, depending upon the nature of the undertaking and the significant natural features of the site location of the project.

Changes in the natural environment may affect land use, aesthetics and the community.

4.2.3 Land Use

When considering land use, agricultural, residential, institutional, commercial, industrial and recreational amenities must be taken into account. Changes in land use may also affect the physical and natural environments as well as the community, aesthetics and historic and archaeological sites.

4.2.4 Aesthetics

Changes in aesthetic resources may have some impact on land use, particularly in residential and recreational areas. Excessive changes in aesthetic quality may also affect the integrity of the community.

4.2.5 Community Disruption

The existing character of the community must be defined and the impacts of the undertaking on it addressed. This includes the social and economic features of the community, in addition to its physical lay-out. Public health and potential annoyances to the general public must also be taken into account.

Changes in the community may result in aesthetic and land use changes.

4.2.6 Historic and Archaeological Sites

Heritage resources must be carefully considered, as they are unrenewable resources that may be irreversibly disrupted or destroyed without adequate planning. As mitigative measures for this component of the environment may be very time consuming to complete, it is wise to consider heritage resources early in the planning stages.

Changes to historic and archaeological sites may result in changes in land use (recreation), aesthetics, and may even disrupt the community.

4.3 Provisions for Mitigation

Design

Through the planning and design process described in this Class EA, it may be determined that certain projects have adverse effects on the environment. The Class EA process is intended to identify impacts and where possible, to avoid them. However, in some cases, this may not be possible. In such situations, measures will have to be taken to either minimize or balance such effects. Actions taken to reduce the effect of a certain project on the environment are called Mitigating Measures.

During design, the environment affected by a project will be established and the specific net effects identified. Measures which must be taken to minimize the negative effects will be worked out such that the design can be tailored to recognize this fact. Contract drawings and documents may then make special provisions to ensure the minimum impact on the environment. Appendix VI sets out a table showing typical mitigating measures for potential adverse environmental effects.

It should be noted that Appendices V and VI identify typical impacts on the environment and typical remedial measures undertaken to minimize these impacts. Certain projects may encounter unusual conditions that produce atypical impacts and require special mitigative measures. These impacts and mitigative measures will be identified on a site-specific basis in the Environmental Study Report.

Construction

This Class EA describes the process by which the various alternatives open to the planner and designer are analyzed and the most suitable design decided. The construction stage presents another set of alternatives as to how the work will be undertaken.

The majority of projects which are subject to the Class EA will be carried out by contracts let by competitive tender. The contract is normally, but not always, the low bidder. It is presumed that he will have costed the work and decided on his method of operation during the bidding stage subject to the specifications and special provisions in the contract and any relevant legislation.

Contractors differ in sequence of operation, techniques, methods of operation, type, make and size of equipment utilized, and speed of operation. There is, however, a fairly general uniformity in construction operation, being the natural result of economic competition.

Some of these operations have potential for environmental impact and, where these can be anticipated in the design stage, special provisions will be written into the construction package. They will spell out what can or cannot be done during specific operations. Where a problem cannot be identified prior to construction, it will have to be addressed on the site and, where significant, an addendum to the Environmental Study Report will be written.

Staff responsible for inspecting the contractor's work must be made aware of such provisions so that they can ensure compliance during construction. It will be the responsibility of the inspector to ensure compliance with the environmental provisions as well as the traditional engineering provisions of the construction package.

5.0 THE ENVIRONMENTAL STUDY REPORT

5.1 Introduction

An Environmental Study Report will be prepared for each Schedule C expansion or upgrading project in this Class which proceeds to implementation.

The proponent will notify any agency or individual who has expressed an interest during the study process, that the Environmental Study Report will be available for review at the appropriate Regional Office and municipal office.

The Environmental Study Report will be submitted as an absolute minimum at least 30 days prior to the advertising for tenders for the project. This 30 day minimum period provides time for review of the report by the above agency. The proponent may acquire property, formalize approvals and advertise for tenders on the project when a written objection has not been received from the public, or review agencies, within 30 days (37 days after the mailing of the notice, where notice is given by prepaid mail).

The Environmental Study Report will summarize and document the work undertaken in stages 1 to 3, which includes:

- the purpose and need for the expansion or upgrading project
- alternatives to the undertaking
- alternative methods of carrying out the undertaking
- the physical, natural, social and engineering environmental conditions of the project area
- an evaluation of the potential impacts on the environment of the undertaking, the alternative methods of carrying out the undertaking and of the alternatives to the undertaking
- the financing arrangements for the project
- the basis for recommendation of the expansion or upgrading project
- any special provisions which will be incorporated into the contract specifications in order to mitigate identified/potential adverse environmental impacts
- provisions for monitoring the project

5.2 Format and Content

The format of an Environmental Study Report prepared for a project in this Class will generally follow the outline of the five chapters listed below:

1. Background Information

2. Summary of the Design Process

3. Existing Conditions

4. Alternatives and Evaluation

5. The Expansion and/or Upgrading Project

In addition, the report will include such appendices as are appropriate for the particular project.

The typical content of the report chapters and appendices are discussed in the following subsections.

Chapter One: Background Information

ESR 1.1 **Purpose of the Report**

This first section will describe, in general, what the particular Environmental Study Report represents in terms of the Environmental Assessment Act, 1975. For example, the section might include the following paragraphs:

> "This Environmental Study Report represents the documentation of the environmental assessment process undertaken for a specific project to upgrade and/or expand an existing sewage and/or water system under the jurisdiction of the Ministry of the Environment. A Class Environmental Assessment has been accepted and approved by the Minister of the Environment for projects of this type."

> "An Environmental Study Report documents the overall design process which terminates with the construction of a specific project. It includes a discussion of project purpose and need; the existing physical, natural, social and engineering conditions in the project area; alternative solutions (other than the project) for meeting the identified need(s); the alternative methods of carrying out the project; and the specific construction requirements necessary to mitigate identified adverse environmental impacts."

> The proponent may proceed to advertise for tenders for this project if written objection has not been received within 30 days of the date of submission of this report."

ESR 1.2 **Location of the Undertaking**

This section will typically include:

- a description of the defined limits of the undertaking (i.e. a general locational description, not a legal description)
- a map showing the location of the undertaking and a key diagram illustrating regional locale

ESR 1.3 **Purpose of the Undertaking**

Outlined in this section would be:

- a description of the specific identified problems in the existing sewage or water system, e.g. as associated with public health, water quality, system capacity, potential system failure, disposal of treatment wastes, need for design improvements/new technology
- the specific objective of the undertaking, e.g. "to expand system capacity in order to provide pumping capacity for xx l/s (litres per second)"

ESR 1.4 **General Description of the Undertaking**

The characteristics of the specific expansion and/or upgrading project(s) which have been selected to solve the problem(s) will be summarized in this section, and may include, for example:

- name of the specific sewage or water system or its components
- significant technical features of the undertaking
- anticipated environmental condition changes and mitigative measures to be implemented as part of construction specifications

ESR 1.5 **Justification of the Undertaking**

This section will state why the planned undertaking, as described in Section 1.4, will achieve the objective and meet the need(s) described in Section 1.3 of the Environmental Study Report.

ESR 1.6 **Related Studies**

Previous financial, operational, land use or environmental studies which are relevant to or related to the undertaking or the study area are noted and significant data documented.

ESR 1.7 **Related Environmental Assessment Documents**

This section will indicate, where applicable, those Environmental Assessment documents which are related to the undertaking, including:

- the date of submission to the Ministry of the Environment, if still pending
- date of approval by the Minister of the Environment and Order-in-Council number

- the need and justification for the undertaking, if appropriate
- specific pages in the Environmental Assessment document(s) may be referred to, where appropriate

Chapter Two: Summary of the Design Process

The purpose of this chapter is to **summarize** the proponent's decision-making process which resulted in a recommendation to undertake the specific expansion and/or upgrading project(s). A brief description is provided of the manner in which these were selected. This would include items such as:

ESR 2.1 **The Environmental Assessment**

This section will briefly describe how the environmental assessment of the project was carried out. It will include a short discussion of:

- data collection
- data analysis and evaluation of impacts

The above deals with the topic in general, and detail is documented in the appropriate subsequent chapters, e.g. Existing Conditions, Alternatives and Evaluation.

ESR 2.2 **Project Stages and Organization**

The proponent herein provides explanation of:

- project time frame for design and construction
- project organization - project team, external input, etc.

ESR 2.3 **Internal Participation**

Ministry of the Environment offices, branches and section which were involved in the project are identified and the type and extent of their involvement described, e.g. memorandum on operating problems - Regional Office.

ESR 2.4 **External Participation**

The names of those persons who were involved in the project on behalf of the following agencies and the type and extent of their involvement will be documented, e.g.:

- provincial ministries, agencies
- municipal and provincial elected officials
- municipal technical staff

ESR 2.5 **Public Involvement**

The type of public participation, the extent, the number of meetings, who was invited, how notification of meetings was made, etc., will be documented.

Chapter Three: Existing Conditions

The purpose of this chapter is to briefly describe existing physical, natural, socio-economic and engineering conditions in the study area to the extent appropriate for the particular location and nature of both the existing system and the expansion and/or upgrading project(s).

The information conveyed in this chapter should clearly indicate the inter-relationships between various condition factors, e.g. the relationships of natural environmental or socio-economic conditions to engineering conditions. The information included in this report will typically be arranged in four sections, as follows:

ESR 3.1 **Physical Environment**

This section will briefly describe those existing physical conditions relevant to the project area and the project, e.g. bedrock geology, surficial geology, surface and subsurface drainage, topography and landforms, air quality, ambient noise levels, water quality, climatic features.

ESR 3.2 **Natural Environment**

The factors described in this section, as appropriate to the project area and the project will include vegetation, wildlife populations and habitat characteristics (e.g. quantity and quality, sensitivity, etc.), aquatic life and habitat characteristics.

ESR 3.3 **Socio-economic Environment**

The description of socio-economic conditions of the project area will include such factors as existing land uses, cultural activities, heritage resources, proposed land uses and programs, community values and economic affordability.

ESR 3.4 **Engineering Conditions**

The pertinent engineering conditions of the project area and the existing sewage or water system will be explained, including such factors as existing condition of the system, hydraulic capacity, water quality, operational problems, hydrogeological and drainage considerations, land area constraints.

Chapter Four: Alternatives and Evaluations

The purpose of this chapter is to document the various sets of alternatives that were considered, to rationalize tradeoffs made in the evaluation and selection of an alternative(s), and to identify any environmental concerns which influenced the selection of the recommended expansion and/or upgrading project(s).

ESR 4.1 **Alternatives to the Undertaking**

This section describes the alternative solutions, **other than** the expansion and/or upgrading project(s), which were considered as potential ways of resolving the identified problems.

The advantages and disadvantages of the alternative solutions are outlined with respect to the appropriate engineering, and physical, natural and socio-economic factors. This section also states how and why the specific alternative solutions were eliminated from further consideration (i.e. the evaluation process and its results).

ESR 4.2 **Alternative Methods of Carrying Out the Undertakings**

This section describes the various alternative **design solutions** that were considered for the specific expansion and/or upgrading project(s). The advantages and disadvantages of the design alternatives are outlined with respect to the appropriate engineering, and physical, natural, and socio-economic factors. The evaluation process used to select the recommended design alternative is also described.

This section also describes any **alternative construction solutions** which were considered with respect to the design alternatives, including the recommended design, e.g. staging of construction, interim servicing, construction methods and timing.

The advantages and disadvantages of the construction alternatives are discussed, as are the potential effects on the natural and socio-economic environment of implementing or not implementing the construction alternatives. The evaluative process used to eliminate construction alternatives from consideration is also explained.

ESR 4.3 **Review of Identified Concerns**

The purpose of this section is to document any concerns of the public, provincial ministries/agencies and municipal agencies which influenced the selection of alternatives or project design and the steps taken to deal with these concerns.

Chapter Five: The Expansion and/or Upgrading Project(s)

The purpose of this chapter is to describe the recommended design for the expansion and/or upgrading project(s) and the specific requirements for its construction.

ESR 5.1 **Description of the Selected Design**

The specific engineering characteristics of the expansion and/or upgrading project will be explained. The information included in this section may include, for example, plans and profiles, property requirements, system components, staging of the expansion and/or upgrading work.

ESR 5.2 **Potential Environmental Effects of the Selected Design**

This section describes the potential direct and, where possible and appropriate, indirect and synergistic environmental effects, both positive and adverse, of the actual **design** of the expansion or upgrading project.

ESR 5.3 **Potential Environmental Effects of Construction**

This section will describe three interrelated factors as follows:

- the specific construction requirements associated with implementation of the project, e.g. blasting, movement of large volumes of soil, dewatering
- the potential direct and indirect environmental changes, both beneficial and adverse, associated with these specific construction requirements, e.g. soil erosion, alterations to water quality
- the mitigative measures to be incorporated into the contract documents to minimize potential adverse environmental changes, e.g. use of temporary mulches, control of equipment movement and location, timing of the construction work, use of coffer dams and sediment traps. The Guidelines "Environmental Considerations for Planning the Construction of Provincial Sewage and Water Projects" (Appendix VII) will assist the designers in the selection of the appropriate mitigative measures.

ESR 5.4 **Summary of Potential Environmental Effects**

This section will summarize the potential net environmental effects of the expansion and/or upgrading project(s), both beneficial and adverse, in light of the mitigative measures to be incorporated into the **design** of the project and into the **construction** contract specifications

ESR 5.5 **Monitoring Program**

For various projects in this Class, it may be necessary to establish monitoring programs to ensure that the **design** and **construction** mitigative measures have achieved the desired objectives. Such programs will be outlined in this report. For more details on monitoring, see Sections 5.4 and 6.5 of this Class document.

Appendices

The information contained in the the appendices will, of course, vary for any particular project in this Class. The purpose of the appendices is to provide technical information which supports and further explains the discussions in the main text of the Environmental Study Report. The items in the appendices may, for example, include:

- A1 - fold out maps and plans
- A2 - natural environment studies
- A3 - socio-economic studies
- A4 - evaluation table - for the alternatives to the undertaking
- A5 - evaluation table - for the alternative methods of carrying out the undertaking
- A6 - the selected design - specific design criteria
- A7 - summary of concerns of other ministries or agencies and submissions made by individuals, citizen's groups and public agencies with respect to the project
- A8 - list of applicable provincial Acts, and Ministry of the Environment policy documents and guidelines

5.3 Revisions and Addenda

The Class EA must establish a specific mechanism for bringing significant changes in a project's design or manner of implementation (construction and/or operation) from that which was originally described in the ESR, to the attention of those parties having the potential to be affected by such changes. Therefore, it is a requirement of the Class EA that the procedure for instituting such a change be as follows:

1) A change will be discussed with all government agencies and the public having the potential to be affected by the change.

2) If, as a result of these discussions, it is determined that the change constitutes a significant deviation in the project's design or manner of implementation, an addendum to the ESR will be written. This addendum will describe the circumstances necessitating the change, the environmental implications of the change and what, if anything, can and will be done to mitigate any negative effects. The addendum will be filed with the ESR and notice of the filing of the addendum will be given immediately to all affected parties. There will be five working days following the giving of notice of the filing of the ESR addendum to allow affected parties to review the proposed change and respond to the proponent. The change can be instituted following the termination of the review period.

3) If, as a result of consultation, the change is not considered to be significant, an addendum need not be prepared and the change could be instituted immediately.

4) A significant delay may occur between the completion of the design process and the implementation of the project. In such cases, a review of the design process will be carried out to ensure that the proposed project and any environmental mitigation is still valid. If significant modification of the proposed project or any additional environmental mitigation is appropriate, an addendum to the Environmental Study Report will be prepared and notice given.

5) Implementation of those portions of the project which are the subject of an addendum, or have the potential to be directly affected by the proposed change, will cease and will not be reactivated until the termination of the five working day review period.

5.4 Monitoring

There are two types of monitoring associated with the Class Environmental Assessment process. The first monitors activities during construction and operation of the facility to ensure that the mitigative measures identified in the ESR are carried out as specified. The accuracy of the ESR in predicting impacts and the effectiveness of the recommended mitigative measures may also be evaluated. This section of the report deals with this type of monitoring.

The second type of monitoring, discussed in Section 6.5, evaluates the effectiveness of the Class Environmental Assessment in achieving the objectives of The Environmental Assessment Act.

5.4.1 Purpose of Monitoring Programs

Monitoring and inspection provides an accounting mechanism for proponents, consultants, contractors, government agencies, and the public to learn from successes and failures associated with the implementation of an activity.

A good monitoring and inspection program promotes continued improvements in project planning, construction, and operation. This could decrease the incidence of environmental damage and could potentially avoid contentious issues and possibly prosecutions. It also has the beneficial effect of increasing the credibility of the proponent.

Monitoring and inspection ensures that there is direct feedback from what is actually experienced in the field to what was predicted in the project planning phase. Thus, the Environmental Study Report (ESR) impact predictions can be re-evaluated and improved from project to project. Also, unexpected impacts that occur during a project's implementation can be identified and action taken to mitigate negative effects. Monitoring is one mechanism whereby the need for an addendum to an ESR can be identified.

The examination of impacts on a more scientific and quantifiable basis can lead to better knowledge and decision-making concerning the level or extent of mitigation necessary to ameliorate negative environmental impacts, and enhance the benefits associated with an undertaking.

5.4.2 Monitoring Program Requirements for Construction Activities

The ESR will provide an accurate description of conditions which exist prior to the implementation of the undertaking. The anticipated effects of construction of the undertaking and the proposed actions to mitigate those effects will be predicted.

The ESR will outline a program which will monitor the key impacts expected to be associated with a project's implementation. If no significant impact, positive or negative, is predicted, the ESR would indicate that the proponent does not foresee a need to monitor key impacts, since none have been identified, and a monitoring report will not be prepared.

If a monitoring and inspection program is considered necessary, the proponent will be responsible for outlining in the ESR a program that satisfies the following requirements:

- A definition of the objectives of the monitoring and inspection program.
- A clear indication of the key impact predicted that will be monitored during and immediately following construction; i.e. maintenance period.
- An outline of the information required to evaluate the cause and effects of each impact to be monitored in order that the successes and failures of the measures selected to avoid or mitigate the predicted adverse environmental effects of the undertaking during all phases of construction, can be examined. This shall include, but not be limited to, the frequency and timing of surveys, location of monitoring sites or areas, methods of data collection, analysis and evaluation.
- The expected reporting production format and date(s) of filing shall be identified in the ESR.

Monitoring documentation shall be prepared based on the above-noted requirements. This monitoring documentation shall draw conclusions and make recommendations. In certain instances, it may be necessary or be desirable to submit monitoring documentations during the construction phase. The documentation may be in the form of a report(s) or letter(s).

All monitoring documentation shall be filed in the Public Records at the same location as the ESR for the specific activity to which it applies.

5.4.3 Construction Guidelines

It is a requirement of the Class EA that Contract Documents contain provisions respecting the manner in which the adverse effects of construction activities are to be mitigated. These provisions will reflect the spirit and intent of the appropriate sections of the document: "Environmental Considerations for Planning the Construction of Provincial Sewage and Water Projects, Ontario Ministry of the Environment, August 1982". These guidelines were developed to provide assistance to planners, construction supervisors, and contractors during the drafting and carrying out of construction agreements.

These guidelines are presented as Appendix VII of this document. The original version of these guidelines was published in February 1977. Appendix VII is a revision to the original document and the second edition, November 1980 which incorporates the appropriate construction techniques that had been developed and presented in the following documents:

- "Standard Specifications for the Construction of Sewers and Watermains", Ministry of the Environment, as revised, 1980.
- Ontario Hydro "Construction and Site Restoration Guidelines for Transmission Facilities", Draft - February 15, 1980.
- "Environmental Quality Implementation Handbook", for Ministry of Natural Resources Dams and Dykes, December 1979.
- "Environment, Agricultural and Resource Guidelines for the Construction and Operation of Pipelines in the Province of Ontario", Ontario Energy Board, September 1979.
- "Highway Construction Practices and Potential Environmental Concerns", Ministry of Transportation and Communications, 1978.
- "Field Environmental Protection Concerns for Construction Staff", Ministry of Transportation and Communications, 1976.

In order to incorporate new techniques for mitigating adverse construction effects into MOE's construction practices, MOE will undertake to periodically review and amend the construction guidelines. Amendments will be instituted utilizing the mechanisms for amending the Class EA described in Section 6.7, below.

5.4.4 Monitoring Program Requirements for Operational Activities

With regard to the monitoring of operational activities of sewage treatment plant effluents, the monitoring of plant effluent will be consistent with Policy No. 08-06: "Policy to Govern Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)". TUMMIS* will evaluate on a continuous basis whether the effluent quality is in compliance with the effluent quality as established in accordance with Appendix C, "Procedural Guidelines for the Derivation of Sewage Treatment Works Effluent Requirements and for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works" of Policy No. 08-01: "Levels of Treatment For Municipal and Private Sewage Treatment Works Discharging to Surface Waters".

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* Total Utility Monitoring and Management Information System

Monitoring of treated water quantity and quality will be done through the TUMMIS program as outlined in the Ontario Drinking Water Objectives and the following three proposed policies: Minimum Treatment Requirements for Potable Water Production from Surface Water Sources; Minimum Treatment Requirements for Potable Water Production from Ground Water Sources; and The Requirements for Continuous Monitoring of Potable Water Quality.

In addition to the requirements for quality monitoring of treated water, effluent, and sludge, other parameters as deemed necessary and described in the ESR can be monitored by plant personnel on a routine basis.

All information as described above is public information and can be obtained by contacting the appropriate Regional Office of the Ministry of the Environment.

For special cases, as identified during the planning process and documented in the ESR, a special monitoring program may be required to evaluate the success of the implementation of a project. For example, an upgrading at a sewage treatment plant can be the result of odour complaints received. At a water treatment plant, an upgrading may consist of measures directed at energy conservation. A specific monitoring program would be established during the preparation of the ESR. This monitoring program would assess whether the objectives of the upgrading have been met. In certain circumstances, this may involve contact with the public.

Where a special operational activity monitoring program is established, the proponent will be responsible for outlining in the ESR a program that satisfies the following requirements:

- A definition of the objectives of the monitoring program
- A clear indication of the key impact predicted that will be monitored after the completion of the upgrading and/or expansion
- An outline of the information required to evaluate the cause and effect of the impact to be monitored in order that the success or failure of the upgrading and/or expansion can be examined. This shall include but not be limited to the frequency and timing of surveys, location of monitoring sites, methods of data collection analysis, and evaluation
- The expected reporting production format and dates of filing shall be identified in the ESR

Where specific monitoring documentation on operational activities is considered necessary, this monitoring documentation shall be filed in the public records at the same location as the ESR for the specific undertaking to which it applies.

If no specific monitoring program for operational activities is considered necessary, the routine monitoring program will apply, and this will be stated in the ESR.

6.0 PROCEDURES AND PROVISIONS

This section of the document details methods of implementing certain requirements of the Class EA or explains the timing of some procedures. In some cases, examples of how to carry out specific aspects of the Class EA requirements are presented.

6.1 Provisions for Public Involvement

Section 3.3 and Appendix IV detail the steps during the planning process when the public must be contacted. This section of the document describes some of the methods that may be used to ensure that potentially interested members of the public are properly informed of the project.

Contact with the public may involve a variety of approaches. The nature of the contact should be tailored to the scope of the proposed project, scale of the potential effects, and timing of the planning for the project. Information about a project and the opportunities being offered for public participation can be presented in newspaper advertisements, in public information or drop-in centres, with locally targeted questionnaire mail-outs, or in specific meetings with local neighbourhood residents. Where a project's planning has reached the stage where specific members of the public who have the potential to be affected by the undertaking can be identified (e.g. property owners adjacent to a preferred site), contact may involve very specific, one-on-one approaches such as individual letters or telephone conversations.

When a member of the public is being contacted for the first time, the contact will include an explanation of the relationship of the planning exercise to the EA Act (e.g. information on the appropriate Class EA procedures being followed, including the future points of contact which that party may wish to avail himself of, and the mechanisms whereby the particular project may be elevated to the status of an individual environmental assessment). As well, information will be presented on the project itself and the planning that has been conducted to date (e.g. information on the need for the project and the planning and design details formulated to date). The contact will provide the introduction to the forum in which potential impacts and local sensitivities can be discussed. Presumably, parties being contacted may simply be referred to the location of the appropriate public record maintained at MOE's District Office or other convenient locations to obtain documentation on the planning that has been conducted to date. In addition, it is most important that the parties being contacted be provided with the name and location of the appropriate consulting firms who can speak to the planning that has been conducted to date and the status of the project under the Class EA.

When outlining the opportunities for participation in a project's planning, MOE will make it clear that the onus is on the party being contacted to determine whether that party wishes to remain involved in the planning process. If, within a specified, reasonable period following the

time of contact, MOE does not receive an indication of a desire to remain involved, MOE will be under no obligation to provide further contact with that party throughout the remainder of planning unless that party takes the initiative at a later stage to be put back on the list of people to be contacted.

However, once the location of the preferred alternative has been identified and alternative methods of carrying out the project are being considered, input from the general public should be solicited again. Contact is not limited to those who previously expressed an interest in the project, as many may not get involved until the location is known and a decision is imminent. The public is advised that a preferred solution has been selected and is given the most pertinent details. It may be of advantage to point out that the preferred solution was selected only after serious consideration of all environmental factors and previous input from the public and other agencies.

6.2 Document Availability

A copy of all Environmental Study Reports prepared for projects which are the subject of a bump-up request shall be submitted to the Environmental Assessment Branch immediately upon the proponent becoming aware of the bump-up request.

A copy of any other Environmental Study Report shall be forwarded to the Environmental Assessment Branch and any other government review agencies, upon written request. All Environmental Study Reports shall be filed on public record for a year after project implementation.

6.3 Bump-up Procedures

6.3.1 Bump-up into Individual Environmental Assessments

Specific steps for reviewing and making decisions respecting the elevation of projects from Class EA status to individual EA status must be established as part of the Class EA procedures. Therefore, it is a requirement of the Class EA that the procedure for bumping a project up out of the Class EA approval will be as follows:

1) A person with a concern must, first of all, bring it to the attention of the contact person within MOE who has been identified for the project;

2) If the concern is not resolved through discussions with the proponent, the person can request that the proponent initiate a bump-up;

3) The proponent shall submit a copy of all Environmental Study Reports prepared for projects which are the subject of a bump-up request to the Environmental Assessment Branch immediately upon the proponent becoming aware of the bump-up request;

4) If the proponent refuses to voluntarily remove the project from Class EA approval and treat it under individual EA requirements, and the person with the concern wishes to pursue the bump-up, he may request the Minister of the Environment to direct the proponent to do an individual environmental assessment for that project;

5) The Minister would obtain arguments from both parties and would make a decision;

6) If the Minister agreed to bump the project up, the Minister would give notice with reasons to the proponent and the person requesting the bump-up that the Class EA approval does not apply to the specific project under discussion. The proponent would then be required to prepare and submit an individual EA for that project, resolve the issue with the person requesting the bump-up; or defer the project;

7) If the Minister did not agree to bumping the project up, he would give notice with reasons to the person requesting the bump-up and the proponent.

The proponent shall not acquire property or otherwise proceed with any portion of a project which is directly related to that part of a project which is the subject of a bump-up request until after the bump-up written request has been resolved.

The bump-up procedure may be initiated at any time during the planning process up to the termination of the 30-day period following notification of a Schedule B provision or the 30 day ESR review period or the fifteen day ESR addendum review period (or such longer or shorter periods as may be established, see Section 3.3.1).

It is expected, however, that anyone having a concern would bring it to the proponent's attention early in the planning process when the proponent has maximum flexibility to deal with the concern. An obvious delay in bringing forward a concern and subsequent request for bump-up is not as likely to be as effective as a concern identified early in the planning process.

If a governmental mechanism is established outside of MOE to deal with requests for bump-up, proposals to amend a Class EA and other matters under the EA Act, the Minister may transfer the authority to make bump-up, amendment, and such other decisions to that body.

6.3.2 Intermediate Bump-Up Provisions

As set out in Schedules A and B of Appendix II, any project may be elevated from Schedule A status to Schedule B status and from Schedule B status to Schedule C status at the proponent's discretion.

The Minister, if he decides to turn down a request for individual bump-up, may decide to elevate a project from Schedule B status to Schedule C status.

6.4 Property Acquisition

The proponent shall not acquire property or otherwise proceed with an undertaking (proceeding with a project does not include activities such as planning and design) until after the termination of the 30 day review period following notification of a Schedule B provision or of an Environmental Study Report submission, or termination of the five working day review period following notification of submission of an addendum to an ESR.

6.5 Monitoring of Class Implementation

Monitoring during construction and operation of a facility as described in Section 5.4 will determine the accuracy of the ESR in predicting impacts and the effectiveness of the recommended mitigative measures. In addition to that monitoring, it is important that the effectiveness of the Class EA be monitored.

Experience with the use of the Class EA for specific projects will be reviewed to identify opportunities for improvement of program delivery and to identify changes, as appropriate, to improve the effectiveness of the Class EA. This review will include an examination of the following:

- Has consultation with the public and government agencies at the mandatory contact points been effective in both informing and providing for input in the planning of the project?
- What methods of public participation have been used, and have these methods been useful in informing those that have the potential to be affected by the project, in providing them with information to effectively participate in the planning of the project?
- On what projects have bump-up requests been received, what were the reasons for bump-up requests, and how have the bump-up requests been resolved?
- Have any problems arisen with respect to the prohibition of property acquisition until after determination of the 30-day review period following notification of an Environmental Study Report submission?

- On what projects have addenda to ESR been issued, what were the reasons for the addenda?

- Does the classification of activities in Schedules A, B and C in Appendix II of this document provide for a reasonable method of planning and implementation of the activities?

- Are the descriptions of the activities, falling in Schedules A, B and C, sufficiently clear to identify specific projects to a category?

- Do MOE and consulting engineering staff, undertaking projects under the Class EA, find the document comprehensible and easy to use?

- Has Appendix V, "Typical Changes in the Environment Caused by Construction Activities, Expanded Facilities and Facility Operation", been useful in the prediction of changes to the environment caused by the project, and do these typical condition changes adequately reflect conditions experienced in the field?

- Has Appendix VI, "Typical Remedial Measures for Adverse Environmental Condition Changes", been used in the planning of the projects to minimize environmental impacts, and do the remedial measures described adequately minimize environmental impact?

- Are changes necessary to the "Environmental Considerations for Planning the Construction of Provincial Sewage and Water Projects", as presented in Appendix VII, to minimize environmental impacts during construction?

- Have new, innovative mitigation measures been designed and implemented, were these effective and could these be implemented on other projects?

Information obtained from the monitoring program will be evaluated to determine whether changes are necessary to ensure better program delivery and hence ensure that the objectives of the EA Act are being achieved. The appropriate changes and reasons for these changes will then be formulated so that these can be incorporated in an amendment of the class document (see section 6.7).

6.6 Applicable Lesisglation and Duplication in Hearings

6.6.1 Hearings Under the Environmental Assessment Act, Environmental Protection Act, and Ontario Water Resources Act

The Ontario Water Resources Act (O.W.R.A.) is not directly binding upon the Crown. However, for projects being developed under this Class EA, the proponent is subject to all of the requirements of the Ontario Water Resources Act, except for the hearing requirements.

The Environmental Protection Act (E.P.A.) is binding upon the Crown. Hearings are required, or may be required, pursuant to seeking approvals under the E.P.A. Therefore, projects being developed under the Class EA, such as certain processed organic waste management activities which are subject to the E.P.A., may be subject to duplicate hearings: a hearing under the E.P.A., and, following a bump-up out of Class EA to Individual EA status, a hearing under the Environmental Assessment Act (E.A.).

Under Section 34 of the E.A. Act where there is a possibility of duplicate hearings, the Minister of the Environment is required to make an order. The order can either prohibit the hearing under the other Act (E.P.A.) and provide that the E.A. Act applies, or permit the hearing under the E.P.A. and provide that all or certain provisions of the E.A. Act do not apply.

As noted before, this MOE Class EA document received Minister's approval on September 29, 1983 with Order-In-Council No. 2731/83 (see Section 1.2). As part of this approval the Minister ordered pursuant to clause 34(b) of the Environmental Assessment Act, that the Environmental Assessment Act applies to the undertaking and the public hearings under the Ontario Water Resources Act and the Environmental Protection Act shall be deemed not to be required or permitted.

This order was made since the Minister was of the opinion that if a public hearing is required on any project, the matters that could be at issue might not be limited to technical engineering matters regulated under the Ontario Water Resources Act and the Environmental Protection Act, and, as such, a public hearing under the Environmental Assessment Act would be the better Act under which to conduct the hearing. If hearings are to be held with respect to individual projects, they would have been bumped-up out of the undertaking approved under this Class EA, and will be proceeding as individual undertakings subject to individual environmental assessments.

6.6.2 Hearings under Other Statutes

Individual projects which are not bumped-up and are proceeding under the Class EA may be subject to hearings under other statutes. These include such statutes as the Expropriations Act, the Ontario Municipal Board Act, and the Planning Act.

6.6.3 Application of the Consolidated Hearings Act, 1981

Where it appears likely that more than one hearing before more than one tribunal will be held under the Acts listed in Section 6.6.2 or under any other Acts listed in the Schedule of the Consolidated Hearings Act, 1981, for an activity included in one of the Class undertakings, the proponent may give a notice under the Consolidated Hearings Act, 1981, which would result in all of those hearings being carried out and the decisions which are made as a result of such hearings being made by a joint board under the Consolidated Hearings Act, 1981. The Consolidated Hearings Act might also be applied in the case of a project which has been bumped-up and is being treated as a separate undertaking and for which an individual environmental assessment is done.

6.6.4 The Endangered Species Act, 1971

Under the Endangered Species Act, no person is allowed to destroy or interfere with the habitat of any species declared in the regulations to be threatened with extinction, or to kill, injure or interfere with endangered species. Presently, 14 species are protected under the Act. They are listed below but, as species are occasionally added, the list should be continuously updated.

1. Blue racer, Coluber constrictor foxi Baird and Girard
2. Timber rattlesnake, Crotalus horridus horridus Linnaeus
3. Peregrine falcon, Falco peregrinus anatum Bonaparte
4. Bald eagle, Haliaeetus leucocephalus alascanus Townsend
5. West Virginia white butterfly, Pieris virginiensis Edwards
6. Lake Erie water snake, Natrix sipedon insularum Conant and Clay
7. Piping plover, Charadrius melodus Ord
8. Eskimo curlew, Numenius borealis Forster
9. Golden eagle, Aquila chrysaetos Linnaeus
10. White pelican, Pelecanus erythrorhynchos Gmelin
11. Mountain lion or eastern cougar, Felis concolor couguar Kerr
12. Small white lady's-slipper orchid, Cypripedium candidum Muhl
13. Kirtland's warbler, Dendroica kirtlandii Baird
14. Small whorled pogonia, Isotria medeoloides (Pursh.) Raf.

6.7 Amendment to the Class Document

The purpose of an amending procedure is to allow for modifications to the Class EA and their approval after experience with the application of the Class EA procedures has been gained. The reasons for such modifications may include: the need to clarify ambiguous areas of the document and their procedures if these cause problems; to streamline the planning process in areas where problems may have arisen; or to extend the application of the Class EA to types of projects that were not previously included. Therefore, it is a requirement of the Class EA that the procedure for amending the Class EA be as follows:

1) Anyone who feels than an amendment to the Class EA should be made can bring the particular concern, the reasons for that concern, and the proposed change to the attention of the Minister of the Environment.

2) The Minister will be authorized to make or deny changes to the document without seeking further Cabinet authorization.

3) The Minister may wish to have major changes considered by Cabinet. Anyone will be able to require that the Minister refer a particular change to Cabinet for its consideration.

4) Prior to making any changes to the Class EA, a Notice of Intent to Amend will be issued to any potentially affected government agencies and the public. A minimum period of 30 days will be allowed for public and government agency response. Based on the comments received, the Minister may choose to declare the change to be a new undertaking, and in order to effect the change, a new environmental assessment would have to be submitted for review and approved under the EA Act, and;

5) If the Minister considers that the change is not significant enough to require a new EA he may declare that the proposed change may be made pursuant to subsection 7(3) of the Act.

6) The proponent may also request that the approval given the Class EA document be extended for a stated period of time.

APPENDIX I

DESCRIPTIONS OF TYPICAL SEWAGE AND WATER TREATMENT SYSTEMS

APPENDIX IA

DESCRIPTION OF PROCESSES AND EQUIPMENT IN EXISTING SEWAGE SYSTEMS

Subsurface Disposal Systems

The purpose of a septic tank system is to return to the soil the sewage and other liquid wastes from the household in such a manner that groundwater does not become polluted and no sewage appears at the ground surface. The system consists essentially of two main parts:

- the septic tank, which by settling out solids, prepares the sewage for absorption by the soil
- the leaching bed where the liquid is treated and dispersed into the soil

The main function of the septic tank is to remove solids which would otherwise plug the leaching bed. Bacterial action breaks down much of the solid matter to liquids and gases and, in an efficiently operating tank, only a liquid is discharged to the leaching bed. This liquid is still highly charged with bacteria and nutrients. Sufficient capacity is provided in the tank for the retention of insoluble matter. The removal, when necessary, of sludge and scum from the tank should ensure its continued efficient operation.

The leaching bed consists of lines of perforated or open jointed pipe, or of clay tile laid with open joints, located in trenches. Liquid waste from the tank passes into the soil where further treatment occurs, helping to purify the effluent so as not to contaminate ground or surface water. The perforated pipe or open jointed pipe or tile is referred to as the distribution pipe. It is distinct from the solid pipe used to transport the sewage to the leaching bed or as headers or connecting lines within the bed. The bacterial action in the leaching bed is aerobic, meaning that the presence of oxygen is necessary in the soil.

Primary Treatment

Primary treatment is mechanical in nature. Settling tanks are used to remove the solids, floating scum and grease from the waste water. This form of treatment is used only when the effluent will meet the water quality requirements of the receiving body.

Settling tanks (clarifiers), equipped with sludge and scum removal mechanisms, provide a detention period of approximately two hours for the incoming waste water. This detention period allows the waste particles to settle to the bottom of the tanks from where it is removed by pumps for conditioning prior to disposal. The sludge removed is pumped to a digester or other treatment facility, where it is processed or dewatered before final disposal.

Primary treatment usually precedes biological treatment, which is carried out in secondary plants.

To summarize, primary treatment removes the heavier particles, scum and grease from the waste water. The effluent produced is of a lower standard of quality than is achieved in complete treatment. The amount of solids removed ranges from 40 to 60 percent.

Lagoon Treatment

A lagoon treatment facility or waste stabilization pond makes use of natural purification by regulating such processes. For instance, in nature microorganisms, through time, react with organic material and break it down into carbon dioxide and microbial cell material. Natural purification is achieved by soil microbes working together with oxygen, dissolved and organic materials.

In a stabilization pond, loading, depth, soil conditions and liquid losses (all of which are controlled) together with wind action, sunlight, algae growth and oxygen provide the environment necessary for the aerobic bacterial action and photosynthetic oxidation required to stabilize the wastes.

The microorganisms cultivated convert much of the organic carbon in the wastes to carbon dioxide. This carbon dioxide, together with dissolved minerals and sunlight, provides conditions for the growth of algae, which in turn provide a plentiful supply of oxygen for the microorganisms. When the organic materials have been converted into bacterial bodies, dissolved minerals and gases, the stable liquid portion remaining is discharged to a receiving body or evaporates into the atmosphere.

To summarize, the waste water is collected in a lagoon where, by regulating the natural purification process, the organic materials are converted and the waste water is purified. This is accomplished in such a manner that no nuisance conditions develop.

A lagoon treatment facility may also be equipped with aeration devices to reduce the retention period. In this case, algae do not play a part in the oxidation process. The lagoon is equipped with a mechanical device that blows air into the contents or with paddles that continuously agitate the contents. This eliminates the need for prolonged retention of waste water by increasing the efficiency of the oxidation process.

Secondary Treatment

Secondary treatment processes may be added to a primary treatment facility to produce a higher quality effluent. It removes the finely divided, suspended and dissolved materials remaining in the waste water. Normally secondary treatment consists of aeration tanks or "basins" and a secondary settling tank.

Biological communities of microorganisms are developed and maintained in aeration tanks where they are supplied with a plentiful supply of oxygen. The air supply can be provided by compressed air, which revolves and disperses the surface, thereby transferring atmospheric oxygen into the tank's contents. Besides providing dissolved oxygen for the micro-organisms, the agitation also prevents settling of solids.

As the organic impurities are assimilated by the micro-organisms, the resulting sludge is light and flocculent and can readily be settled out in a secondary settling tank.

Tertiary Treatment

Secondary treatment plant effluents can create some undesirable conditions in receiving streams through adverse effects on dissolved oxygen levels, which result in unwanted changes in the stream organisms. Also, these discharges can bring about excess growth of algae and other aquatic plants.

To arrest these conditions, an advanced type of treatment called tertiary has been developed as a "polishing" stage to follow conventional secondary treatment processes for the further reduction of organic content. This improves receiving water conditions as far as dissolved oxygen levels are concerned. Another important result of tertiary treatment is the reduction of nutrient levels which algae utilize for growth.

No tertiary treatment form is typical. It must be adapted to the particular need of the receiving water concerned.

Various Design Features of Primary/Secondary/Tertiary Treatment Facilities

Coarse Bar Screens:
A coarse bar screen is a protective screen installed at the entrance to the plant or pumping station to prevent the entry of large objects which could damage machinery or equipment.

Comminution:
Comminuting (shredding) equipment is used to reduce large particles in the flow to a size suitable for handling in the treatment units. These units are installed ahead of or behind grit and sand removal facilities.

As the grit and sand settle, a suction pipe draws the contents from the bottom of the chamber and deposits it into channels or a hopper. The water is returned to the flow and the grid and sand collected is periodically removed. The turbulance of the water in the chamber keeps the organic material in suspension.

Effluent Filter:
Where required, a sand filter is installed to filter the effluent before it is discharged to a watercourse. When receiving waters are small or very low flows are encountered during the summer months, this method of "polishing" the effluent is very effective and ensures a high degree of removal of waste materials from the final effluent.

Chlorination:
Chlorinating facilities disinfect the effluent before discharge from a plant. In most cases a chlorine contact chamber serves this purpose. In this chamber the final effluent undergoes a detention period of 15 to 30 minutes to ensure good contact with the chlorine. The effluent outfall sewer, running from the plant to the receiving waters, is sometimes used to chlorinate the effluent in much the same way as the chamber process.

Various Sludge Treatment Processes at Primary/Secondary/Tertiary Treatment Facilities

Sludge is composed of solids removed from waste water by a treatment process.

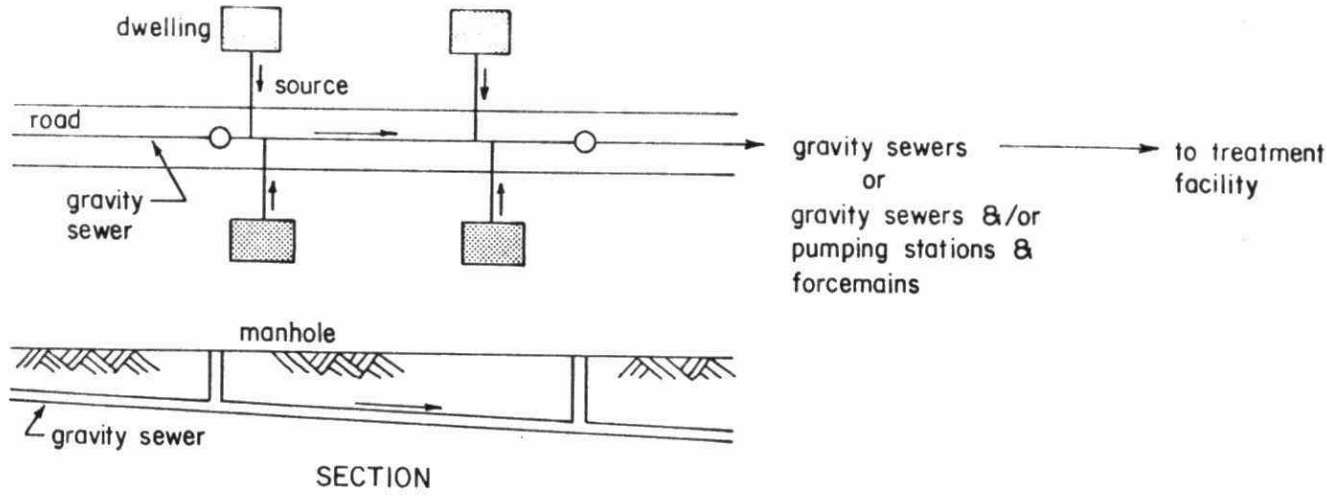
Anaerobic Digestion:
Digestion is the decomposition, by anaerobic bacteria, of settled solids or sludge removed from waste water. This is carried out in a digester, a special structure equipped with various piping and valve arrangements, and heat transfer equipment.

The raw sludge is pumped to the digester where it is broken down by anaerobic bacterial action, at a regulated temperature of 90 to 95 degrees Fahrenheit. When it is thoroughly digested a thick black, odorless liquid remains which can be used as a soil conditioner.

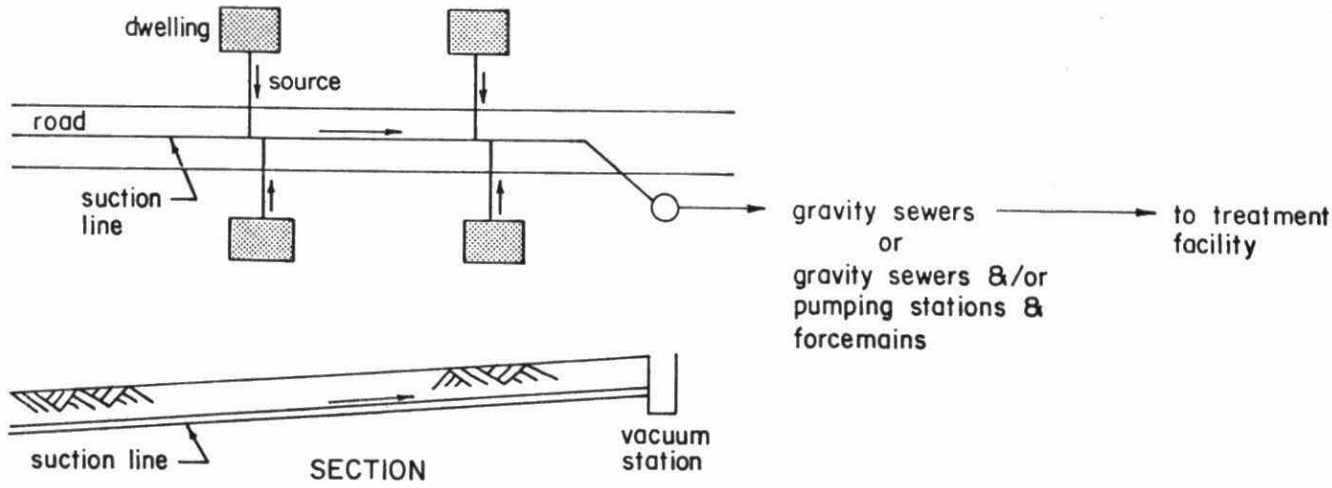
A by-product of digestion - methane gas - is utilized as fuel for plant heat exchangers and boilers.

In smaller plants the entire process usually is carried out in one digester, but in larger plants two digesters generally are required to handle the larger volume of sludge, and the process is carried out in two stages. In two-stage operation the primary digester(s) initially receive the raw sludge to begin the process with the contents being agitated. The secondary digester(s) complete the process in a quiescent state.

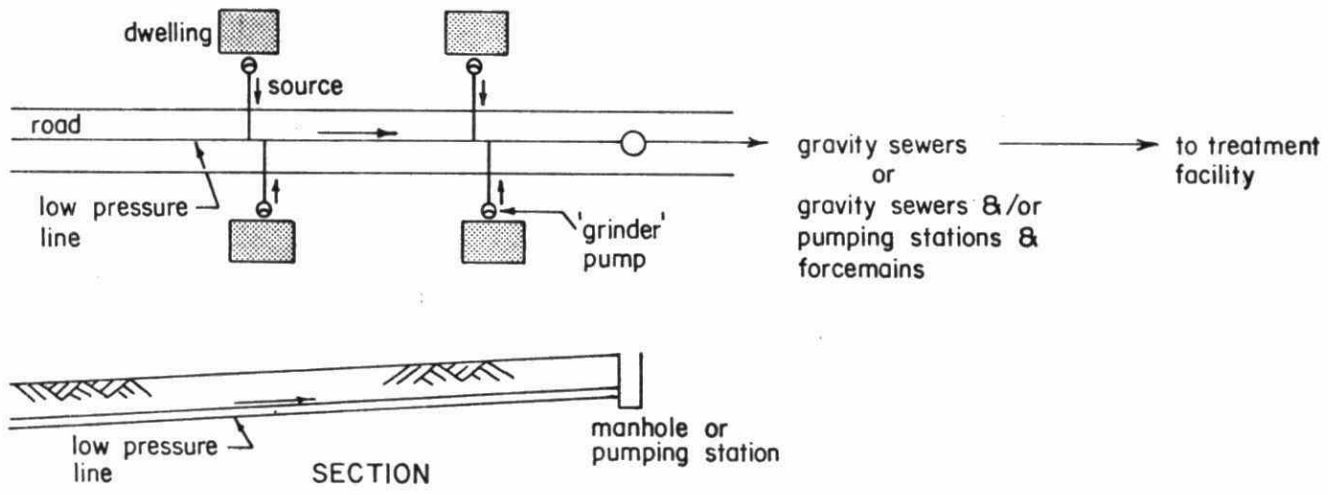
Sludge Drying Beds:
In smaller installations sludge drying beds may provide the means for dewatering.



a. GRAVITY COLLECTION

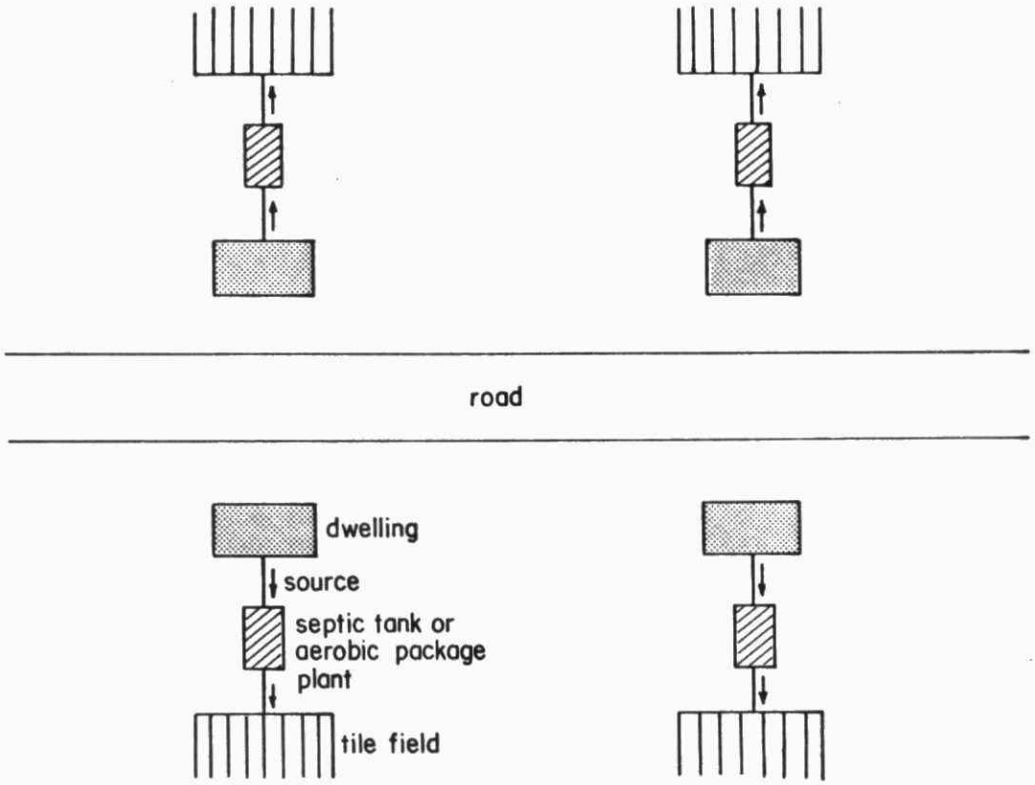


b. VACUUM COLLECTION

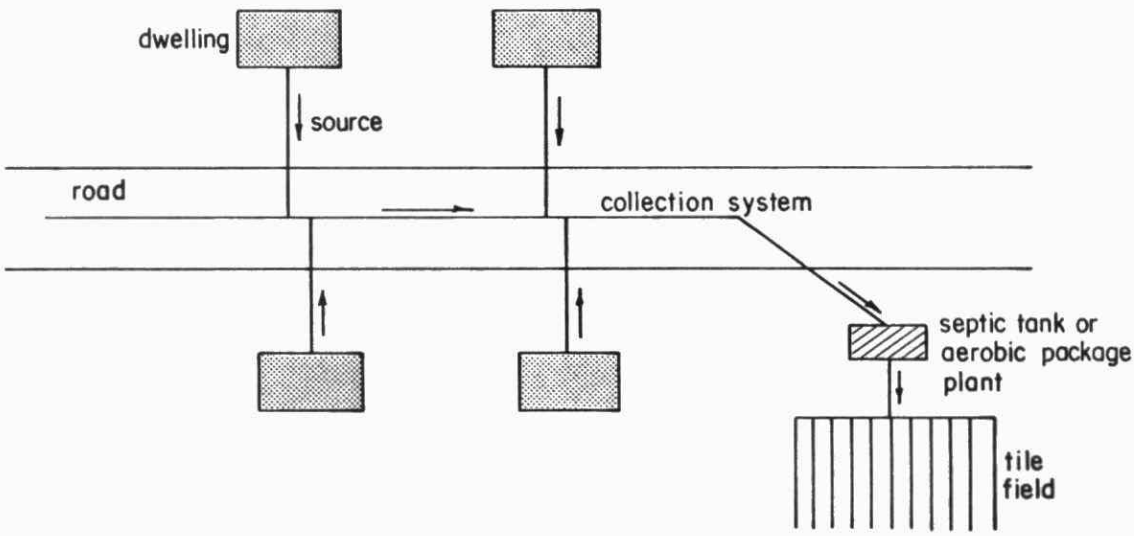


c. LOW PRESSURE COLLECTION

SEWAGE COLLECTION FACILITIES

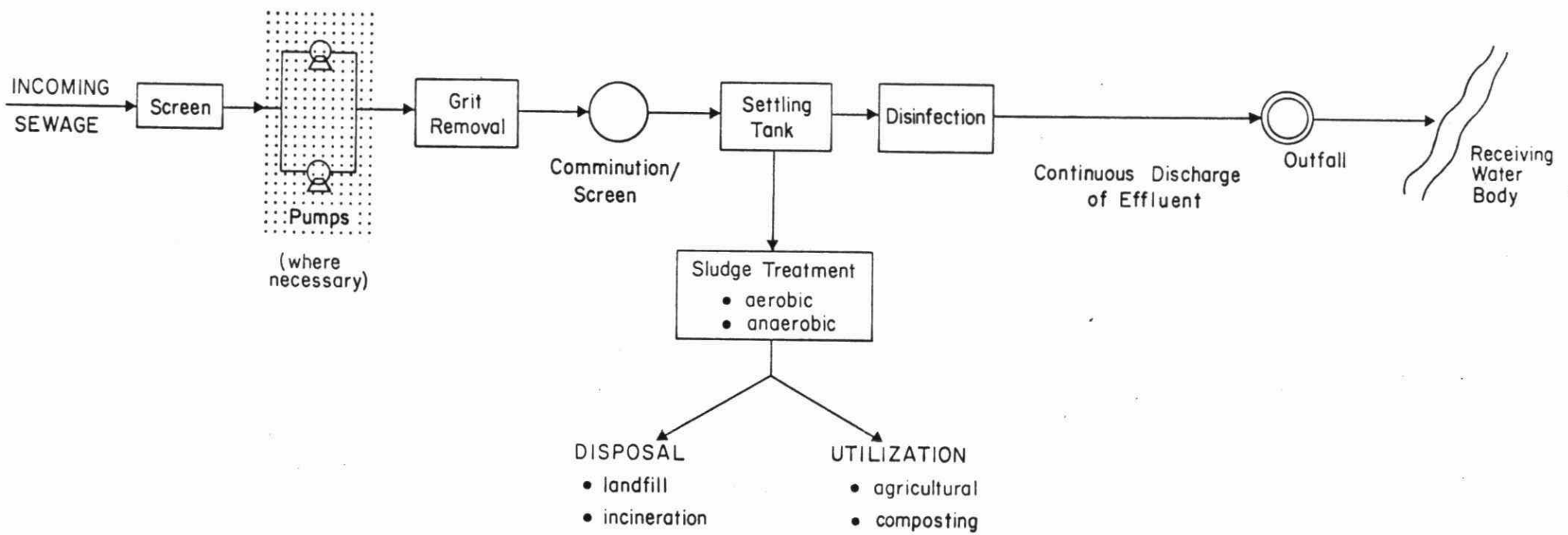


INDIVIDUAL TREATMENT
& SUBSURFACE DISPOSAL SYSTEM



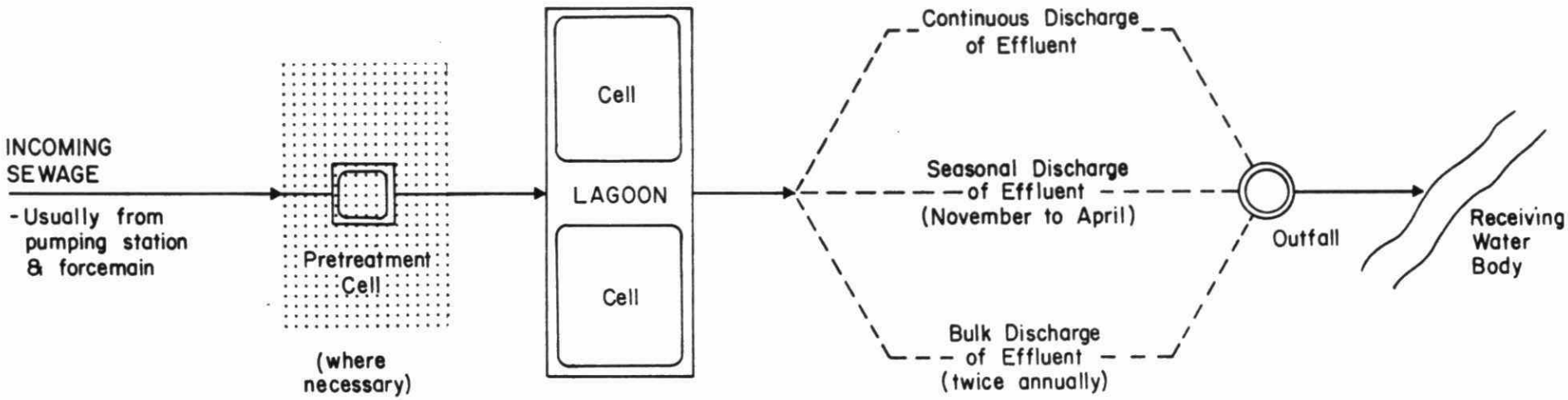
COMMUNAL TREATMENT
& SUBSURFACE DISPOSAL SYSTEM

PRIMARY TREATMENT FACILITY



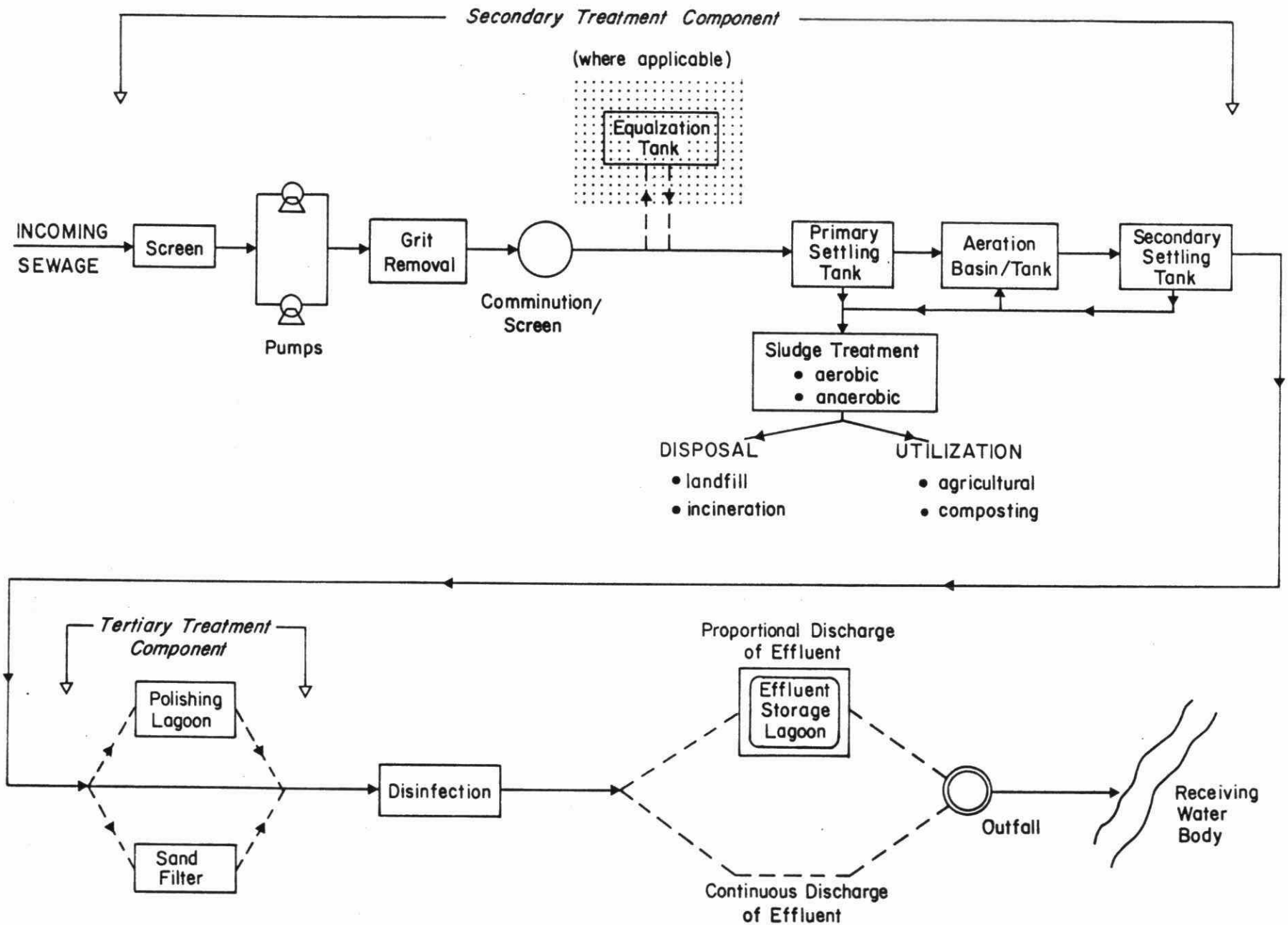
Note: This diagram illustrates the typical major components of a primary treatment facility. An individual facility may not, however, contain all the components shown or have the components in the order indicated.

TYPICAL LAGOON TREATMENT FACILITY



Note: The lagoon may be aerated with either diffused air or mechanical aeration throughout the whole or a portion of the lagoon or pretreatment cells. The lagoon usually has two or more cells.

SECONDARY & TERTIARY TREATMENT FACILITY



Note: This diagram illustrates the typical major components of a secondary & tertiary facility. An individual facility may not, however, contain all the components shown or have the components in the order indicated.

APPENDIX IB

DESCRIPTION OF TYPICAL WATER TREATMENT PROCESSES AND EQUIPMENT

(SURFACE WATER SUPPLY)

The object of treatment is to use the most efficient processes and equipment to remove impurities found in each specific source. For this reason, the following methods and items all may be used in a plant, or only a few may be required, depending on the quality of the source of supply. Outlined are typical water treatment processes and equipment. Illustrations of the typical facility configurations appear on the following pages.

Low Lift Station

A low lift station is a raw water receiving station and reservoir, which is equipped with pumps, motors, screens and other equipment. The intake pipe extends out from this station into the lake or river, and the raw water enters the reservoir by gravity flow.

Located in the building, at the terminal point of the intake, is a bar screen, which obstructs the passage of any large objects entering the intake. Following this are usually stationary or travelling fine screens, which remove as much of the screenable material as possible before the water enters the raw water reservoir.

The low lift station, then, is a pumping station for delivery of raw water to the treatment plant, and houses the equipment which provides initial screening for the removal of the larger impurities.

Microstrainer-Algae Removal

A microstrainer is a rotary drum covered with a cloth or steel-mesh blanket resting on a concrete frame. The blanket openings are measured in microns, with the size being dependent on the type of algae encountered.

In operation the drum rotates and, as the water passes through, the algae contained in the water are enmeshed on the blanket. Most units are equipped with an ultra-violet light attachment, which acts as a germicidal agent. Periodically the microstrainer is backwashed or flushed with water under pressure to remove the accumulated algae and clean the blanket. The wash water is discharged to waste.

Flocculation-Colour, Turbidity and Bacteria Removal

A flocculator is a concrete structure equipped with large paddle wheels which rotate to agitate and mix the water passing through. At the entrance end of the flocculator is a small mixing chamber equipped with a revolving blade mixer, or alternatively, in-line mixers are used.

In operation, chemical coagulants such as alum, lime and ferric sulphate, are fed into the mixing chamber with the water. These coagulants form a gelatinous, sticky precipitate, which absorbs colour and entangles mud, bacteria and suspended matter. The flocculator's agitation allows this gelatinous mass to build up into clumps, or floc, which are readily removed by settling.

After flocculation, the treated water enters a settling basin to allow settling of the floc. The basin may be equipped with sludge removal facilities for periodic removal of the floc.

Filtration-Turbidity and Bacteria Removal

There are two main types of conventional filters used to remove minute impurities from water, the gravity filter and the pressure filter.

The gravity filter is a concrete basin or tank equipped with a straining system (media) and underdrains for the passage of filtered water. The filter media may consist of graded sand and gravel, graded sand and gravel with a top dressing of anthrafilt, or anthrafilt alone. (Antrafilt is a type of hard coal carefully crushed to a desired size.) The filter is equipped with backwashing facilities for periodic removal of accumulated impurities.

In operation, the raw or conditioned water flows by gravity through the filter, and the impurities contained in the water are transferred to the media. The filtered water then passes through the underdrains into a clear water reservoir.

The pressure filter is a steel tank consisting of the same filter media materials as the gravity filter, except the water is forced through under pressure.

Chlorination-Destruction of Bacteria

The complete removal of pathogenic bacteria (disease organisms) is essential in water supplies. Water which has been treated efficiently should be free of harmful bacteria. To ensure this, chlorine is applied as a germicidal agent before it is delivered to the consumer.

Chlorine is sometimes utilized in the early stages of treatment for bacterial reduction. When used for this purpose, it is called pre-clorination. Pre-chlorination immediately before delivery to a reservoir or the consumer is referred to as post-chlorination.

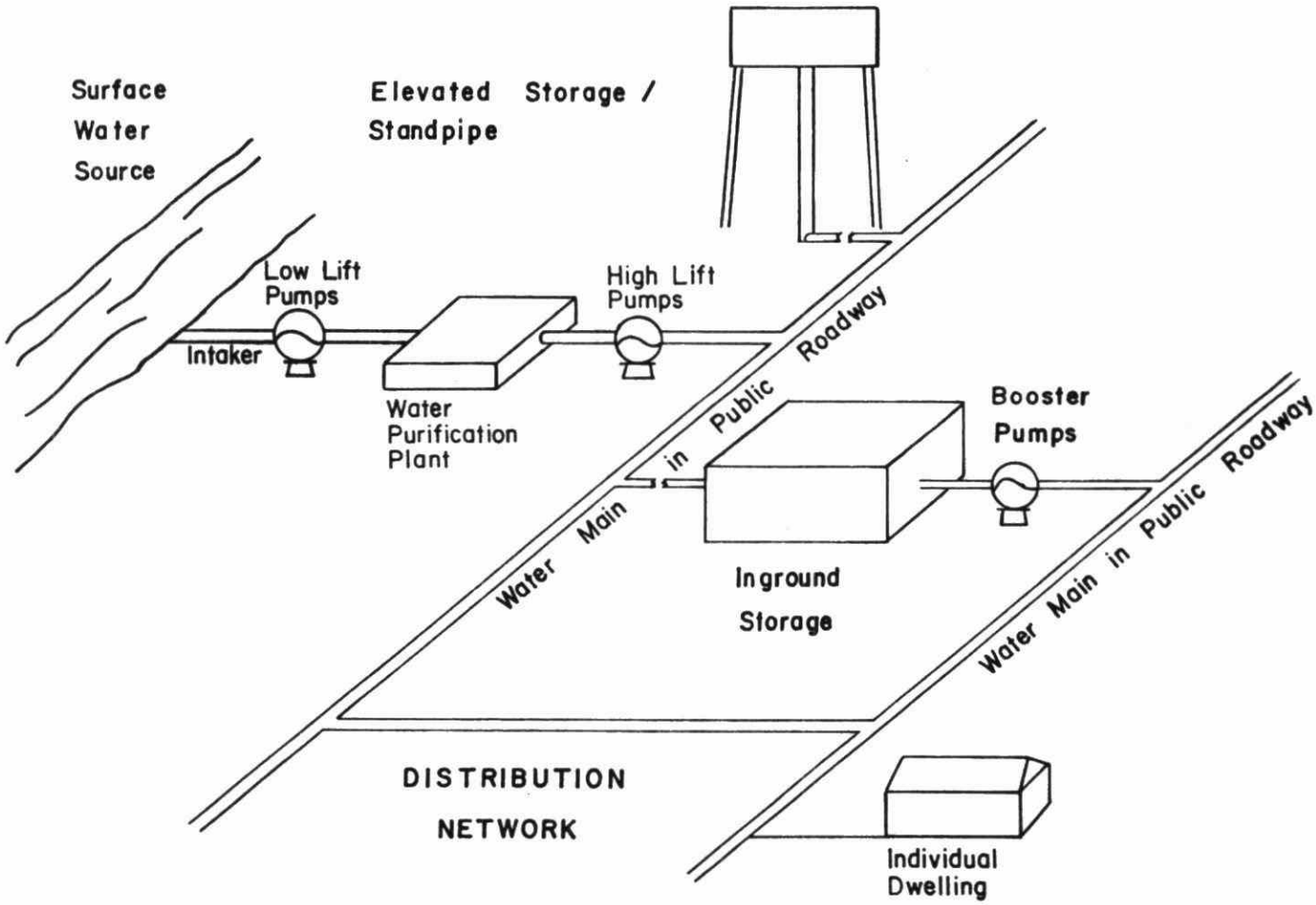
Fluoridation

Where a local municipality or a local board owns or operates a water works system in Ontario, the council of the municipality may establish, maintain and operate a fluoridation system in connection with the water works system.

Treatment Wastes

At four stages in the water treatment process, i.e. the travelling water screen, microstrainer, sedimentation basin and filter bed, various forms of waste are removed. The waste may be in the form of solids which have been screened, settled out or filtered from the water during treatment and in the form of backwash water. Backwash water and sludge may be discharged to an existing sanitary sewer or placed in a holding pond and/or mechanically dewatered and then hauled to an approved disposal site.

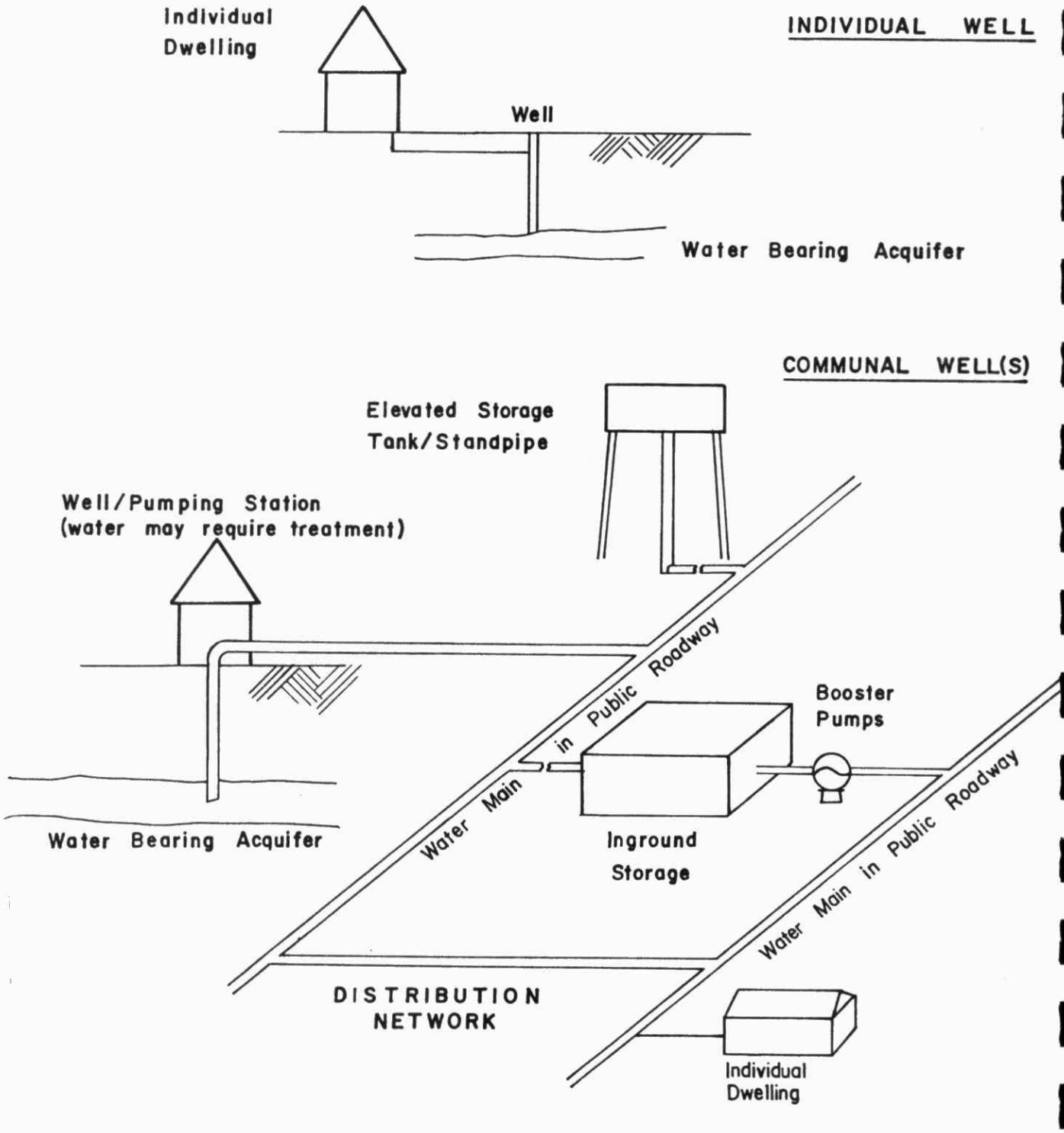
SURFACE WATER SOURCE



Note :

This diagram illustrates the typical major components of a communal well and water distribution network, including possible storage facilities and booster pumping stations. An individual system may not contain all the components shown.

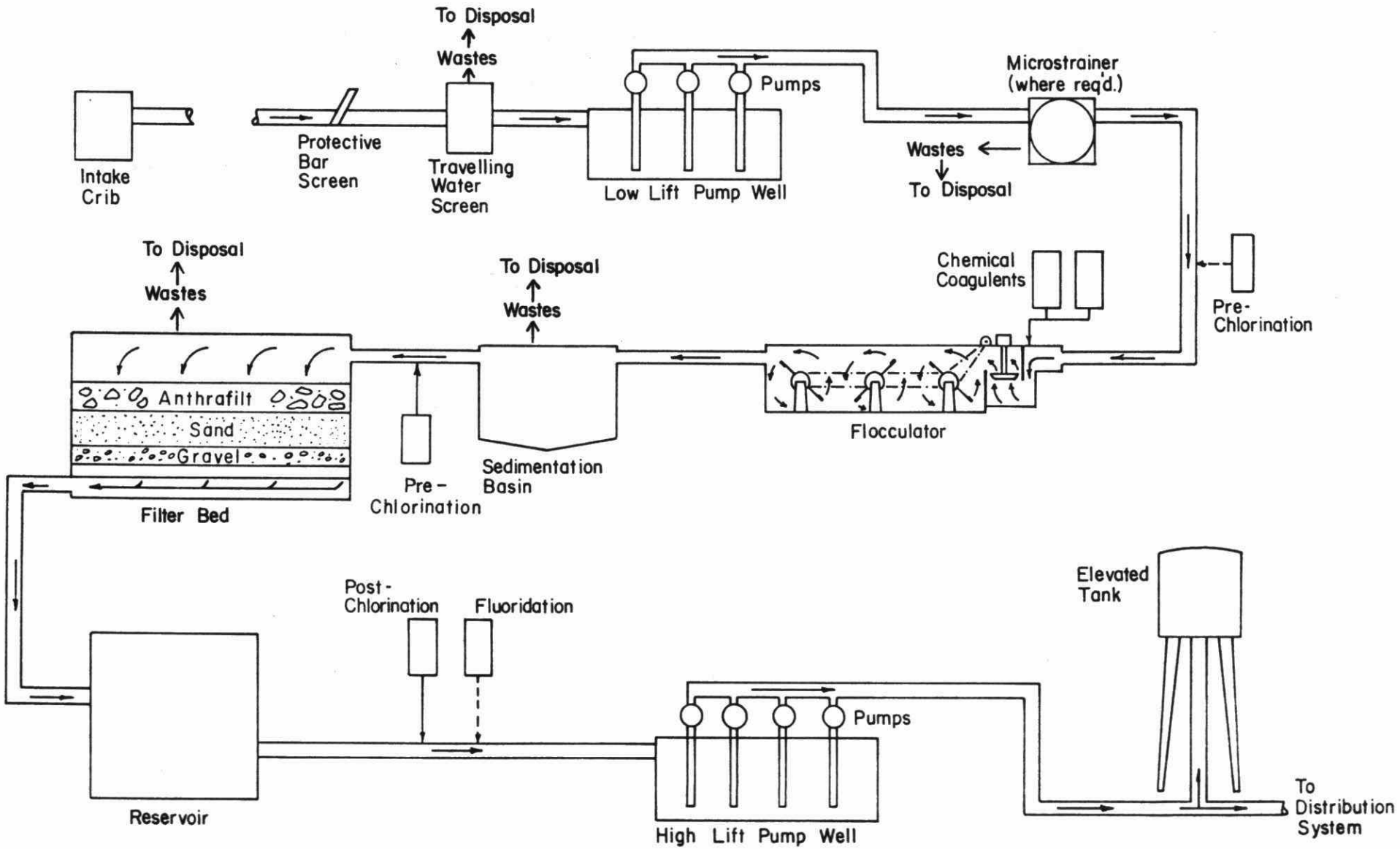
GROUND WATER SOURCE



Note :

This diagram illustrates the typical major components of a communal well and water distribution network, including possible storage facilities and booster pumping stations. An individual system may not contain all the components shown.

TYPICAL WATER TREATMENT PROCESSES IN A WATER TREATMENT PLANT



APPENDIX II

SCHEDULES A, B AND C ACTIVITIES

FOR SEWAGE AND WATER TREATMENT FACILITIES

SCHEDULE A ACTIVITIES

1. Increasing pumping station capacity by adding or replacing equipment and appurtenances, where the new equipment is located within the same shell or housing containing the existing pumping equipment.

2. Installation of new standby power equipment or increasing standby power capability by the replacement of existing standby power equipment, where the new equipment is located within the same shell or housing containing the existing standby power equipment.

3. Extend existing sewage collection system or water distribution system in road allowances, easements, or utility corridors shown on approved draft plans of subdivision or approved plans of subdivision.

4. Utilization of sewage treatment plant sludges on agricultural lands in accordance with "Guidelines for Sewage Sludge Utilization on Agricultural Lands," including the establishment of new sludge utilization sites.

5. Establish sludge storage lagoon/basin at existing sewage treatment plant (STP) or water treatment plant (WTP).

6. Establish sludge storage lagoon/basin at soil conditioning site where sludge utilized.

7. Commence disposal of sludge at existing landfill or incineration sites, which are certified under the Environmental Protection Act for sludge disposal.

8. Establish sludge management activity at existing STP or WTP where sludge generated.

9. Establish sludge management activity at existing landfill, incineration or utilization sites, where sludge is to be disposed of/utilized, which sites are certified for the type of sludge management activity proposed.

10. Replace existing well with a new well or deepen existing well at an existing well site property.

NOTES: (1) Since the activities listed in Schedule A are considered to have minimal adverse effect on the environment, there is no mandatory contact or documentation requirement for this category of activity, nor is there a bump-up provision associated with these activities.

(2) Any Schedule A undertaking may be elevated to Schedule B status at the proponent's discretion.

SCHEDULE B ACTIVITIES

Bump-up Provision and Mandatory Contact Requirement

The purpose of a bump-up provision being attached to the mandatory contact requirement is to allow for individual environmental assessments for activities which would otherwise be part of the undertaking approved under this Class EA, but which have significant negative environmental effects.

The procedure for bump-up is outlined in Section 6.3 of this document.

Bump-up requests for projects handled by means of the Mandatory Contact Requirement (see below) may occur up to 30 calendar days after the project has been drawn to the attention of the appropriate agencies and members of the public. When a bump-up request has been received, the project could be elevated to Individual EA Status.

Intermediate Bump-up Provision

Any Schedule B activity may be elevated to Schedule C status at the proponent's discretion or by the Minister, if he decides to turn down a request for individual bump-up (see Section 6.3.2).

Mandatory Contact Requirement

In the case of public notification for the projects that are listed in this schedule, the notification will be made early in project planning.

The proponent may select the method of notification that is appropriate for the specific project under consideration. The methods could range from individual notification to newspaper notices. It is important that those potentially affected by the project are notified early enough in the process that their comments can be reflected in project planning.

(1) Extend existing sewage collection system or water distribution system in existing road allowances, utility corridors or easements not shown on approved draft plans of subdivision, or approved plans of subdivision.

(2) Increase size of existing communal septic tank or tile field at substantially the same location.

(3) Extend, enlarge existing outfall, or provide an additional outfall.

(4) Provide additional treatment facilities in existing lagoon, such as aeration, chemical addition, post-treatment.

(5) Increase pumping station capacity by adding or replacing equipment where a new structure is required for the new equipment.

(6) Installation of replacement or standby power equipment where a new structure is required for the new equipment.

(7) Expand sewage treatment facility or water treatment plant up to existing rated capacity.

(8) Add flow equalization tankage at existing sewage treatment plant for influent and/or effluent control.

(9) Expand buffer zone between lagoon facility or land treatment area and adjacent uses.

(10) Utilization of sewage treatment plant sludges on non-agricultural lands.

(11) Establish sludge transfer lagoon/station for storage of sewage treatment plant sludge to be subsequently utilized on agricultural lands not exceeding 50 ha for each annual sludge application, where soil conditioning sites are not located on the same property as the sludge transfer lagoon/station.

(12) Commence disposal of sludge at existing landfill or incineration sites, which are not certified for the disposal of sludge.

(13) Establish sludge management activity at existing STP or WTP, where sludge is not generated.

(14) Establish sludge management activity at existing landfill, incineration or utilization sites, where sludge is to be disposed of/utilized, which sites are not certified for the type of sludge management activity proposed.

(15) Extend, enlarge existing water intake or add additional intake.

(16) Establish facilities for disposal of water treatment wastes (e.g. install sewer connection, construct holding pond, dewatering and hauling operations to disposal sites).

(17) Increase existing storage capacity by addition or replacement at substantially the same location.

(18) Establish new wells at the existing well site property.

SCHEDULE C ACTIVITIES

Note: The bump-up provision as described in 6.3 of this document applies to this category of project.

(1) Extend existing sewage collection system or water distribution system not in existing road allowances, easements, or existing utility corridors.

(2) Expand existing sewage or water treatment plant beyond existing rated capacity.

(3) Add additional lagoon cells to an existing sewage facility.

(4) Establish an outfall in a new receiving water body.

(5) Provide for land application of effluent through spray irrigation system, overland flow, or marsh treatment.

(6) Construct new storm water retention and detention ponds.

(7) Establish sludge transfer lagoon/station for storage of sewage treatment plant sludges to be subsequently utilized on agricultural lands exceeding 50 ha for each annual sludge application, where soil conditioning sites are not located on the same property as the sludge transfer lagoon/station.

(8) Commence sludge disposal at new landfill site or new incineration site.

(9) Establish sludge management activities other than those described in Schedules A and B.

(10) Utilize a new surface water course.

(11) Establish a new well at sites other than an existing well site.

(12) Artificially recharge an existing aquifer with surface water.

(13) Establish new water storage facilities at sites other than those wherein there already exists a water storage facility or at sites which are not within a road allowance or utility corridor.

APPENDIX III

TREATMENT OF SLUDGE MANAGEMENT ACTIVITIES

UNDER THE CLASS E.A.

Activity	Mandatory Class EA Contacts	Documentation Requirement / Bump-up Provision
SLUDGE UTILIZATION		
Utilization on Agricultural Lands in accordance with "Guidelines for Sewage Sludge Utilization on Agricultural Lands", including the establishment of new sludge utilization sites.	None	No mandatory documentation No bump-up provision
Utilization of Sewage Sludge on non-agricultural lands	As per Appendix IV	No mandatory documentation Bump-up provision
Sludge storage lagoon/basin at existing STP where sludge generated	None	No mandatory documentation No bump-up provision
Sludge storage lagoon/basin located at soil conditioning site where sludge utilized	None	No mandatory documentation No bump-up provision
Sludge transfer lagoon/station for storage of sludge to be utilized on agricultural lands not exceeding 50 ha for each annual sludge application where soil conditioning sites not located on the same property as sludge transfer lagoon/station.	As per Appendix IV	No mandatory documentation* Bump-up provision
Sludge transfer lagoon/station for storage of sewage sludge to be utilized on agricultural lands exceeding 50 ha for each annual sludge application where soil conditioning sites not located on the same property as sludge transfer lagoon/station	As per Class EA	ESR mandatory* Bump-up provision

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*Changes to the Legislation related to sludge handling are being proposed as a result of MOE public consultation process, documented in the Blue Print for Waste Management in Ontario. Proponents of sludge transfer lagoons/stations are advised to determine the status of the proposed changes to the Legislation before entering upon the MOE Class EA planning process.

Activity	Mandatory Class EA Contacts	Documentation Requirement / Bump-up Provision
SLUDGE DISPOSAL		
at existing certified sites	None	No mandatory documentation No bump-up provision
at existing sites, not yet certified	As per Appendix IV	No mandatory documentation Bump-up provision
at new sites	As per Class EA	ESR mandatory Bump-up provision
OTHER SLUDGE MANAGEMENT ACTIVITIES		
at existing STP, where sludge generated	None	No mandatory documentation No bump-up provision
at existing disposal/incineration/ utilization sites where sludge disposed/incinerated/utilized (sites certified under EP Act)	None	No mandatory documentation No bump-up provision
at existing STP, where sludge not generated	As per Appendix IV	No mandatory documentation Bump-up provision
at existing disposal/ incineration/utilization sites (sites not certified)	As per Appendix IV	No mandatory documentation Bump-up provision
at all sites, other than the above	As per Class EA	ESR mandatory Bump-up provision

Note: Appendix III should be read in conjunction with Appendix II, Schedules A,B and C.

APPENDIX IV

OPPORTUNITIES FOR PUBLIC AND GOVERNMENT AGENCY INVOLVEMENT IN PLANNING

Situation	Example	Contact
Works directly affecting:		
Permanent and intermittent watercourses and water bodies	- streams, creeks, marshes, bogs, lakes, ponds	- Conservation Authority - MNR-District Office - MOE-District or Regional Office
Groundwater	- wells, aquifers - groundwater recharge areas	- Local Health Unit, Medical Officer of Health - MOE District or Regional Office
Rare, endangered or significant assemblage of wildlife, fish and plant species	- list pursuant to the Endangered Species Act - game species - regionally significant wildlife, fish or flora	- MNR, District Office - Conservation Authority
Environmentally sensitive area	- sensitive area as identified in MNR's or Conservation Authority's plans	- MNR, District Office - Conservation Authority
Hazard lands	- unstable slopes - steep slopes - floodplain land	- MNR, District Office - Conservation Authority
Woodlots	- Agreement Forests	- MNR, District Office
Ornamental or Street Trees	- trees on provincial land	- Owner of property immediately adjacent to lands containing trees
Recreational Areas	- Provincial Parks and park reserves - Conservation Areas - Niagara Parks Commission - National Parks	- Owner of recreational property
Tourist Facilities	- motels, restaurants scenic lookouts	- Ministry of Industry and Tourism

Historical or Archaeological Resources	- historic buildings/ bridges - scenic areas - historic archaeological sites - historic regions, e.g. Canada-Ontario-Rideau-Trent-Severn Corridor	- Ministry of Culture and and Citizenship, Regional Archaeologist - Local Heritage or Historical Group including local Architectural Conservation Advisory Committee
Social Service Facilities	- homes for the aged - children's mental homes - group homes, etc.	- Ministry of Community and Social Services, District Office
Transportation Services Facilities	- highways - navigable waters/ harbours - St. Lawrence Seaway - airports	- Ministry of Transportation and Communications, District Office - Federal Department of Transport - International Joint Commission
Utilities	- electrical, telephone, oil, gas pipelines - fire route access	- Ontario Hydro - Local Utility Companies - Ministry of the Solicitor General
Sensitive or Special Planning Areas	- regionally significant growth centres, major industrial parks, subdivisions - development in northern Ontario	- Ministry of Municipal Affairs and Housing - Minstry of Industry and and Tourism - Ministry of Treasury and Economics - Ministry of Northern Affairs - Royal Commission on the Northern Environment
Class 1-4 Agricultural Land and Special Agricultural Areas		- Ministry of Agriculture and Food, County Agricultural Representative
Niagara Escarpment Planning Area		- Niagara Escarpment Commission
Parkway Belt Planning Area		- Parkway Belt Group - Ministry of Housing

IN ALL CASES (At the earliest appropriate point in project planning)	- every situation	- property owners adjacent to project site - local area and Regional Municipalities - potentially affected adjacent municipalities, members of the public and government - MOE, District or Regional Office

APPENDIX V

TYPICAL CHANGES IN THE ENVIRONMENT CAUSED BY CONSTRUCTION ACTIVITIES, EXPANDED FACILITIES AND FACILITY OPERATION

The following charts illustrate the typical environmental changes which may be associated with expansion and/or upgrading projects in this class. Changes can occur to various aspects of the social as well as the natural environment. The changes may have beneficial and/or adverse conditions.

Normally, only a few, if any, of these changes, would be related to a particular undertaking in this Class, depending, of course, on the specifics of that project. The charts will assist the personnel responsible for the design and construction of the projects in this Class as they illustrate the range of changes that may be associated with the project. The purpose of the charts is to point out that the personnel responsible for design and construction of projects in this class must be aware of the `holistic´ concept of the environment as expressed in The Environmental Assessment Act and of the interrelationships of natural and social environmental conditions.

VARIOUS SEWAGE AND WATER SYSTEM COMPONENTS

TYPICAL CONDITION CHANGES IN THE ENVIRONMENT CAUSED BY CONSTRUCTION ACTIVITIES, EXPANDED FACILITIES AND FACILITY OPERATION	SEWER PIPES, WATER MAINS, PUMPING STATIONS	TREATMENT FACILITY	OUTFALL	LAND TREATMENT	INCINERATION	SLUDGE DISPOSAL	SLUDGE UTILIZATION (AGRICULTURE)	TILE FIELD	GROUNDWATER WELL	SURFACE WATER INTAKE	ELEVATED STORAGE TANK	ON-GROUND STORAGE TANK	IN-GROUND STORAGE TANK	WATER PURIFICATION FACILITIES
SURFACE DRAINAGE														
- diversion and/or channelization of watercourses	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A
- decreased flood storage capacity through placement of structures and fill material in floodplain	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*
- contamination of surface waters directly or through runoff by chemical spills and leaks	*	*	*	*	N/A	*	*	*	N/A	N/A	N/A	N/A	N/A	*
- contamination of surface watercourse by blasting bedrock formations containing soluble toxic materials	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	*	N/A
- sedimentation and turbidity of adjacent water bodies due to construction activities	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*
- "ponding" effects on adjacent properties due to natural drainage disruption	*	*	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	*	*	N/A
- increased surface runoff from new impermeable surfaces, saturated soils, etc.	*	*	N/A	*	N/A	*	N/A	*	N/A	N/A	N/A	*	*	*
- decreased surface water quantity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	N/A	N/A	N/A	N/A
GROUNDWATER														
- truncation of shallow aquifers and springs	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- contamination of groundwater by blasting bedrock formations containing soluble toxic materials	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	*	N/A
- changes in groundwater quantity, e.g. groundwater interferance at producing wells due to de-watering procedures	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A
- altered groundwater quality (land treatment, sludge disposal/utilization)	*	*	*	*	*	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A
- other groundwater contamination as a result of general construction activities	*	*	N/A	N/A	N/A	*	*	*	*	N/A	N/A	N/A	*	N/A
SOILS/GEOLOGY														
- erosion of cut slopes, stockpiles and fill materials prior to stabilization	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*
- slumping of encroached slopes	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*
- deposition of sediment on adjacent properties	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*
- contamination by heavy metals, petrochemicals, etc. in soils	*	*	N/A	*	N/A	*	*	*	N/A	N/A	N/A	N/A	N/A	*
- mixing of topsoil with subsoil	*	*	*	N/A	N/A	N/A	N/A	*	*	N/A	N/A	*	*	*
TOPOGRAPHY/LANDFORMS														
- "scarring" of unique landforms	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
CLIMATIC FEATURES														
- effect of vegetation removal on snow accumulations adjacent to the facility	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	*	*	*	*
- removal of vegetation causing reduction of "wind-screen" effect on adjacent buildings or activities	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	*	*	*	*
- changes in air quality through addition of particulates, gases, unpleasant odours	N/A	*	*	*	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FISH, AQUATIC WILDLIFE AND VEGETATION														
- modification or removal of existing aquatic habitat including the displacement of plants and animals which may serve as food supply or shelter for other species	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A
- changes in water quality of nearby surface water having value as wildlife habitat	*	*	*	*	N/A	*	*	*	N/A	*	N/A	N/A	N/A	*
- effects of timing of construction activities on spawning and breeding periods	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	*

TYPICAL CONDITION CHANGES IN THE ENVIRONMENT CAUSED BY CONSTRUCTION ACTIVITIES, EXPANDED FACILITIES AND FACILITY OPERATION	SEWER PIPES, WATER MAINS, PUMPING STATIONS	TREATMENT FACILITY	OUTFALL	LAND TREATMENT	INCINERATION	SLUDGE DISPOSAL	SLUDGE UTILIZATION (AGRICULTURE)	TILE FIELD	GROUNDWATER WELL	SURFACE WATER INTAKE	ELEVATED STORAGE TANK	ON-GROUND STORAGE TANK	IN-GROUND STORAGE TANK	WATER PURIFICATION FACILITIES
- lowering of water table resulting in stress to wetland species of fish, wildlife and vegetation	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	N/A	N/A	N/A	N/A
- introduction of warmer water from ponds into colder watercourses resulting in stress to some fish species	N/A	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- production of new aquatic habitats during construction from pits and depressions	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*
- changes in water quality status of existing habitats (e.g. nutrients)	*	N/A	*	*	N/A	*	*	*	N/A	*	N/A	N/A	N/A	*
- impingement of aquatic organisms and fish on intake screens	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A
TERRESTRIAL VEGETATION AND WILDLIFE														
- planting of new vegetation consisting of exotic species thus creating an artificial plant community	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- mortality/stress of vegetation due to damage by construction equipment to sediment deposition, changes in soil moisture conditions, or soil compaction, resulting in reduction and/or deterioration of wildlife habitat	*	*	*	N/A	N/A	N/A	N/A	*	*	N/A	*	*	*	*
- creation of new wildlife habitat by site restoration	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- changes in vegetative composition as a result of environmental changes	*	*	N/A	*	*	*	N/A	N/A	*	N/A	N/A	*	*	*
- removal or disturbance of significant trees and/or ground flora	*	*	N/A	*	N/A	*	N/A	*	*	*	*	*	*	*
- possible effects of accumulated heavy metals and other contaminants on vegetation and wildlife	N/A	N/A	N/A	*	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*
- new or increased exposure of forest edge with resultant effects of windthrow of trees leading to increased loss of habitat for wildlife	*	*	N/A	N/A	N/A	*	N/A	*	N/A	N/A	*	*	*	*
- changes in nutrient status of existing habitats	N/A	N/A	*	*	N/A	*	*	*	N/A	*	N/A	N/A	N/A	*
- destruction of wildlife habitat	N/A	*	*	N/A	*	N/A	N/A	N/A	*	*	*	*	*	*
HERITAGE RESOURCES														
- disruption and/or destruction of sites and structures having significant archaeological, historical or architectural values	*	*	*	*	*	*	*	*	*	*	*	*	*	*
- disruption, destruction or deterioration of sites or structures having significant archaeological, historical or architectural values, as a result of environmental condition changes such as increased air pollution, altered water table, vibration, etc.	*	*	*	*	*	*	N/A	*	*	N/A	N/A	N/A	*	N/A
- unwanted increase in public access and potential vandalism of areas with heritage values	*	*	N/A	N/A	N/A	N/A	N/A	*	*	N/A	*	*	*	*
- threatened viability of or opportunity for retention of sites with heritage values due to changes in setting character resulting in decreased social significance being accorded to site	*	*	*	*	*	*	N/A	N/A	N/A	N/A	*	*	*	*
AGRICULTURAL														
- removal of productive farmland	*	*	N/A	*	N/A	*	N/A	*	*	N/A	*	*	*	*
- disruption of field access from public roads	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- disruption of farm machinery and animal movements on roads accessing the treatment facility	N/A	*	N/A	N/A	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*
- disturbance of livestock by noise and dust during construction	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- disruption of tile and surface drainage systems	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	*
- adverse effects of sludge containing heavy metals and other chemicals, bacteria, and virus from runoff, areas of sludge disposal, and spray irrigation on crops, livestock and people	N/A	N/A	*	*	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- loss of property may lead to reduced viability of individual farm operation	*	*	N/A	*	N/A	*	N/A	*	N/A	N/A	*	*	*	*
- higher crop yield on lands used for spray irrigation and sludge disposal	N/A	N/A	N/A	*	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A

VARIOUS SEWAGE AND WATER SYSTEM COMPONENTS - cont'd

TYPICAL CONDITION CHANGES IN THE ENVIRONMENT CAUSED BY CONSTRUCTION ACTIVITIES, EXPANDED FACILITIES AND FACILITY OPERATION	SEWER PIPES, WATER MAINS, PUMPING STATIONS	TREATMENT FACILITY	OUTFALL	LAND TREATMENT	INCINERATION	SLUDGE DISPOSAL	SLUDGE UTILIZATION (AGRICULTURE)	TILE FIELD	GROUNDWATER WELL	SURFACE WATER INTAKE	ELEVATED STORAGE TANK	ON-GROUND STORAGE TANK	IN-GROUND STORAGE TANK	WATER PURIFICATION FACILITIES
- degradation of water quality affecting irrigation and/or livestock watering as well as general farmstead water use	*	*	*	*	N/A	*	*	*	*	*	N/A	N/A	N/A	*
- reduction of water quality available for for agricultural uses: irrigation, livestock watering and general farmstead use	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	N/A	N/A	*	N/A
RESIDENTIAL														
- effects on safety and movement patterns of pedestrian traffic where residences are adjacent or in proximity to a treatment facility or located along arterial road routes used for trucking sludge to disposal/utilization sites	N/A	*	N/A	N/A	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*
- temporary disruption during construction (inconvenience, noise, dust, detours, etc.)	*	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
- effects of physical changes in use of residential property due to property loss	*	*	N/A	N/A	*	*	N/A	*	*	N/A	*	*	*	*
- effects on property value due to expansion of system components	*	*	*	*	*	*	*	*	*	*	*	*	*	*
- financial and social stresses on, or benefits to residents relocating due to removal of homes	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
- effects of improving collection and treatment of sewage from residential sources	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	N/A
- reduction in water quantity due to drawdown effect in private wells	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*	*
- reduction in water quality due to interference and contamination from drawdown effect in private wells	*	N/A	N/A	N/A	N/A	*	*	*	*	*	*	*	*	*
- beneficial effects of providing new and improved water supply to residential areas	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
INSTITUTIONAL (e.g. school, hospital, church, senior citizens' home)														
- effects on safety and movement patterns of pedestrian traffic where institutional uses are adjacent to or in proximity to treatment facility or along arterial road routes used for trucking sludge to disposal/utilization sites	N/A	*	N/A	N/A	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*
- temporary disruption of institutional activities during construction (inconvenience, noise, dust, detours, etc.)	*	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
- effects of physical changes in layout on institutional use due to removal and/or relocation	*	*	N/A	*	N/A	*	N/A	*	N/A	N/A	*	*	*	*
COMMERCE AND INDUSTRY														
- effects on safety and movement patterns of pedestrian traffic where such uses are adjacent to or in proximity to a treatment facility or located along arterial road routes used for trucking sludge to disposal/utilization sites	N/A	*	N/A	N/A	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*
- temporary business disruption during construction (inconvenience, noise, dust, detours, etc.)	*	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
- effects of physical changes in layout of business uses due to property loss	*	*	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- effects on business viability and operation due to removal and/or relocation	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
OUTDOOR RECREATION														
- effects on environmental conditions in a recreation area due to changes in accessibility to the open space area and/or linkages to the community or other open space areas due to expansion of treatment facility or collection system	*	*	*	*	N/A	*	N/A	*	N/A	N/A	*	*	*	*

VARIOUS SEWAGE AND WATER SYSTEM COMPONENTS – cont'd

TYPICAL CONDITION CHANGES IN THE ENVIRONMENT CAUSED BY CONSTRUCTION ACTIVITIES, EXPANDED FACILITIES AND FACILITY OPERATION	SEWER PIPES, WATER MAINS, PUMPING STATIONS	TREATMENT FACILITY	OUTFALL	LAND TREATMENT	INCINERATION	SLUDGE DISPOSAL	SLUDGE UTILIZATION (AGRICULTURE)	TILE FIELD	GROUNDWATER WELL	SURFACE WATER INTAKE	ELEVATED STORAGE TANK	ON-GROUND STORAGE TANK	IN-GROUND STORAGE TANK	WATER PURIFICATION FACILITIES
- temporary disruption of open space activities during construction (inconvenience to users, maintenance problems, noise, dust, etc.)	*	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*
- effects of physical changes in layout of recreation uses due to property loss	*	*	N/A	*	N/A	*	N/A	*	N/A	N/A	*	*	*	*
- effects on operation of public recreation program due to removal of recreation area	*	*	N/A	*	N/A	*	N/A	*	N/A	N/A	*	*	*	*
- effects on quality of user experience due to changes caused in environmental quality	*	*	*	*	*	*	*	*	*	N/A	*	*	*	*
AESTHETICS														
- removal of vegetation	*	*	N/A	N/A	N/A	*	N/A	*	N/A	N/A	*	*	*	*
- effects of stream improvements or culverting	*	*	*	N/A	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A
- change in scale of facility relative to landscape	*	*	N/A	*	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- adjacent residents exposed to new view	*	*	N/A	*	*	*	*	*	N/A	*	*	*	*	*
- buffer areas around facility decreased	*	*	N/A	*	N/A	N/A	*	*	N/A	N/A	*	*	*	*
COMMUNITY DISRUPTION														
- loss of tax base due to removal of business(es)	*	*	N/A	N/A	N/A	N/A	N/A	*	N/A	N/A	*	*	*	*
- loss of employment due to removal of business(es)	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- disruption of social ties between different parts of a community or its services due to removal of buildings, homes, businesses, etc.	*	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	*	*
- effects on community's perception of community well-being and 'quality of life' afforded resulting from disruption or removal of features valued by the community, e.g. views, trees, swimming area	*	*	*	*	*	*	*	*	N/A	N/A	*	*	*	*
- social effect of improving level of sewage and water collection and treatment services	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*	*
NOISE AND VIBRATION														
- changes in existing noise and/or vibration levels due to expanded operation of facility and/or expansion of facility area closer to or further away from homes, institutional uses, buildings of historic or architectural significance, etc.	*	*	N/A	N/A	N/A	*	*	N/A	*	*	N/A	N/A	N/A	*
PUBLIC HEALTH														
- effects on the physical, chemical and microbiological quality of existing groundwater supplies by changes in the biological regime in areas of spills, spray irrigation and sludge disposal	*	*	*	*	N/A	*	*	*	N/A	N/A	N/A	N/A	N/A	*
- effects of changes on the groundwater elevations on existing subsurface sewage disposal systems	*	*	N/A	*	N/A	N/A	N/A	*	*	*	N/A	N/A	N/A	N/A
- effects on the physical, chemical and microbiological quality of surface water bodies used for water contact recreation/water supply	*	*	*	*	N/A	*	*	*	*	*	N/A	N/A	N/A	*
- effect of increased particulates or chemical air pollutants on the public	N/A	N/A	N/A	N/A	*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- effects of reduced system failure	*	*	N/A	N/A	N/A	N/A	N/A	*	*	*	*	*	*	*
- effects of lowering water level of watercourses on water quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	*	*	N/A	N/A	N/A	N/A

APPENDIX VI

TYPICAL REMEDIAL MEASURES FOR

ADVERSE ENVIRONMENTAL CONDITION CHANGES

INTRODUCTION

The following sections describe some typical adverse environmental condition changes and their possible resolution. The purpose of this appendix is to provide an indication of the types of measures that can be taken to mitigate various adverse impacts and to illustrate where/when these measures could be applied.

What actually would be done on any particular project would depend on such considerations as the nature and location of the project, the characteristics of the local environment, the effectiveness of the measures in engineering and environmental terms and costs. The following subsections therefore, serve only as a general guide to the personnel responsible for design and construction of a project in this Class. Specific environmental concerns will, of course, be identified in the appropriate design stages and documented, along with mitigation measures and construction requirements, in the Environmental Study Report for a project.

In addition to this appendix, the responsible project personnel will consult and refer to various policy statements and guidelines of the Ministry of the Environment and of other agencies. Specific attention is to be paid to the Guideline titled, "Environmental Considerations for Planning the Construction of Provincial Sewage and Water Projects."

It is important to note that an environmental impact may vary in terms of its type, duration, reversibility and severity. Sample definitions of these four factors are included in this appendix prior to the discussion of remedial measures. All of these factors and also the social significance and social values attached to various impacts, must be taken into account.

DEFINITIONS OF THE CHARACTERISTICS OF ENVIRONMENTAL CONDITION CHANGES OR IMPACTS

Impact Type

Direct Impacts

Direct or primary impacts are those associated with straightforward "cause and effect" relationships, e.g. land clearing for construction causes loss of vegetation.

Indirect Impacts

Indirect or secondary impacts are less obvious and may be a second order "cause and effect", such as loss of vegetation results in an elevated groundwater table, but not of a second order associated with the project.

Synergistic Impacts

Various condition changes may result in synergistic impacts in that individually the condition changes may be relatively unimportant but together they form impacts which are "greater than the sum of their parts", e.g. the cumulative effect of minor construction activities on water quality and quantity of a water body.

Duration of Impacts

Short Term

Short term impacts refer to construction induced impacts which last only as long as construction or may be non-construction activities which occur briefly during the operation of the facility.

Long Term

Long term impacts refer to impacts which last the life time of the project or past the construction phase, past the initial activity or action phase, or for the duration of maintenance and operation of the project.

Reversibility of Impacts

Irreversible

Some impacts may result in irreversible changes. The commitment to use non-renewable resources may be irreversible. Accidents may also cause irreversible damage.

Reversible

Those impacts which can be kept to an acceptable minimum or easily rectified before serious damage occurs by applying special mitigating measures are termed reversible impacts.

Severity of Impacts

Moderate and Severe Impacts

Moderate and severe effects are gradations of adverse impacts. Moderate could be characterized as partial elimination, dislocation, impairment, or alteration of biota or use of resources and facilities. Severe could be characterized by total elimination, dislocation, impairment, or alteration of biota or use of resources and facilities.

TYPICAL REMEDIAL MEASURES FOR ADVERSE ENVIRONMENTAL CONDITION CHANGES

This appendix illustrates, in general terms, measures which can be implemented to mitigate various adverse impacts which may result from implementation of an expansion or upgrading project. These measures are not project-specific and serve only as a general guide for reference of the personnel responsible for design and construction of projects in this class.

The specific remedial measures required for a particular undertaking will be developed during the design process for that project, detailed in the Environmental Study Report and incorporated into the construction specification documents.

TYPICAL REMEDIAL MEASURES FOR ADVERSE ENVIRONMENTAL CONDITION CHANGES

Environmental Concern	Remedial Measure	Application (Where/When)
Surface Drainage System		
Sedimentation and turbidity of adjacent water bodies	- erosion control measures	During construction on slopes and drainage channels
	- sediment traps	Collect sediment before entering drainage channel
	- staging work	During biologically critical periods
"Ponding" effects on adjacent properties due to natural drainage disruption	- appropriate use of culverts, porous backfill and tile drains	In new construction projects and expansion
Streambank erosion from diversion and/or channelization of watercourse	- erosion control measures	River crossings, outfall construction
Contamination of surface waters through runoff, spills and leaks	- provision for spill control - fast and accurate reporting of spill - spill containment - stockpile materials or devices for spill control - avoid adverse soil conditions - monitor facility for leaks	As a general practice and particularly in vicinity of water bodies, wetlands

Environmental Concern	Remedial Measure	Application (Where/When)
Through blasting, expose rocks containing soluble minerals that could potentially contaminate surface water supply, i.e. sulfate, lead, arsenic	- subsurface investigation, i.e. geochemical analysis of bedrock - avoid blasting in areas containing toxic materials	Areas of shallow soil over relevant bedrock type (normally occurring in Canadian Shield)
Changes in volume of surface runoff	- use design measures to minimize increase in surface runoff	New impervious surfaces
Changes in flood storage capacity by placing fill and structures in floodplain	- avoid placing fill and structures in floodplain or compensate elsewhere	Construction and expansion within river valleys
Changes in surface water quantity	- obtain water from abundant source	Intake from rivers and draw from wells near rivers and streams
	- maintain stream flow	Groundwater withdrawals
Groundwater		
Through blasting, expose rocks containing soluble minerals that could potentially contaminate groundwater, e.g. sulfate, lead, arsenic	- subsurface investigation, i.e. geochemical analysis of bedrock - avoid blasting in areas containing toxic minerals	Areas of shallow soil over bedrock
Truncation of shallow aquifers and springs	- hydrogeologic investigation to identify such areas in advance	Excavations

Environmental Concern	Remedial Measure	Application (Where/When)
Reduced groundwater quantity through construction dewatering	- avoid groundwater users and water-bearing formations (soils) - proper dewatering techniques	Truncation of shallow aquifers and spring by groundwater utilization
Spills or leaks resulting in contamination of groundwater supply	- construction refueling precautions - landfilling precautions - operation and storage precautions at treatment facility/ pumping station	Near watercourses and on site generally
Drainage of wetland areas resulting in a reduced groundwater contribution to surface water bodies	- avoid wetland areas - utilize appropriate backfill material, i.e. highly permeable backfill is unsuitable	Trenching, excavating, placing fill
Reduced surface water recharge to groundwater particularly in soils with high infiltration characteristics	- restrict extent of impervious surfaces in zones of high infiltration	Subsurface barriers, i.e. foundations, sewage lagoons, areas of impervious surfaces, i.e. parking lots, compaction of soil
Impeded of groundwater movement	- maintenance of the existing groundwater flow regime through engineering design	Dewatering, i.e. in foundations and trenches
Other groundwater contamination	- prevent leaks, spills, etc.	Construction activities

Environmental Concern	Remedial Measure	Application (Where/When)
Contamination of adjacent wells through runoff from road construction	- erosion control - locate projects appropriately	Construction adjacent to well sites
Soils/Geology		
Erosion by wind and water	- revegetation - stage work	Erodible soils in excavations, cut and fill areas
	- avoid highly erodible soils	
	- stabilize slopes: - compaction - chemical stabilizers - gravel blankets - seeding - sodding	Stockpiles, cut slopes
Slumping of encroached slopes	- avoid potentially unstable slopes	Steep slopes
	- mechanical stabilization methods	Cut slopes
	- revegetation (only effective once the root infrastructure has developed)	Removal of the toe of a slope during construction
	- restrict dewatering near slopes	Dewatering
Rockfall hazard	- buffer zone - initiate rockfall at potential failures	Blasting Steep weathered slopes
Loss of aggregate and mineral resources	- avoid sites of aggregate and mineral reserves - extract aggregate and minerals prior to construction	Zones of economic aggregate and mineral occurrence

Environmental Concern	Remedial Measure	Application (Where/When)
Contamination by heavy metals, petrochemicals, etc. in soils	- remedial measures to avoid spills and leaks	For STP's and collection systems
	- land application of residential sludge only	Agricultural land application
	- incineration of sludge	Industrial sludge
Contamination of topsoil with subsoil	- stripping and stockpiling of topsoil and stabilization	Generally in areas of undisturbed soils
Topography		
"Scarring" of unique features	- avoid unique features	Designation of unique feature, i.e. landmark
Climatic Features		
Removal of vegetation causing reduction of windscreen effect on adjacent buildings or activity	- retain as much vegetation as possible	Construction in close proximity to buildings or activity areas
	- avoid vegetated areas in close proximity to buildings or activity areas	
	- restore vegetation as soon as possible	
Change in air quality from added particulates, gases and odours	- use of air pollution control measures	STP's and incinerators

Environmental Concern	Remedial Measure	Application (Where/When)
Fish, Aquatic Wildlife and Vegetation		
Introduction of warmer water from ponds into colder surface watercourse	- appropriate selection of ponding site - infiltrate into groundwater system	Dewatering of trench and excavations Sediment traps
Modification or removal of aquatic habitat. Displacement of plants and animals	- stage work to non-critical times - restore stream substrate - choose suitable site for stream diversion	During construction, e.g. river crossings, and dewatering of excavations
Reduced water quality of nearby surface water having value as wildlife habitat	- provisions for spill control - fast and accurate reporting of spill - spill containment - stockpile materials or devices for spill control - avoid adverse soil conditions - monitor for leaks and overuse of disposal systems - minimize tree removal	STP's, collection system, various diverse disposal facilities for effluent and sludge
Timing effects of construction on spawning and breeding periods	- staging of work to avoid spawning and breeding periods	For stream crossings and diversions
Lowering of water table resulting in reduced contribution to streams and stress on riparian vegetation	- design to maintain existing groundwater flows - restrict extent of impervious surfaces in zones of high infiltration	Dewatering of trench and excavations Areas of newly created impervious surfaces

Environmental Concern	Remedial Measure	Application (Where/When)
Increased nutrient status of existing habitats	- provisions for spill control - landfilling precautions	Near watercourses and on site generally
Impingement of aquatic organisms and fish on intake screens	- position design and screening	New water intake screens
Drainage of wetland areas causing mortality or stress to animals and possible changes in species composition	- maintain existing groundwater regime - avoidance of wetland areas - utilize appropriate backfill material, i.e. highly permeable backfill is unsuitable	Trenching or excavating
Siltation to surface watercourses resulting in "smothered" plants, fish eggs and animals due to deposition of silt and increased turbidity to surface watercourses	- utilize suitable backfill material - trench drainage should be discharged to settling areas before being permitted to enter surface waterbodies - erosion control measures - staging of work	Trench constructions Intakes, outfalls Erodible soils, stockpiles
Pressure on biological communities	- consider the carrying capacity of the local natural environment	Water and sewage services allow enhanced municipal/ population growth. This increases stress on recreational and natural resources.
Tree removal will affect the amount of sunlight reaching waters and affect plant productivity and increase watercourse temperatures	- avoid tree removal near surface water bodies	Stream crossings

Environmental Concern	Remedial Measure	Application (Where/When)
Terrestrial Vegetation and Wildlife		
Introduction of exotic plant species through erosion control measures and restoration	- use annuals which later die out - use indigenous (native) species only	On slopes and other areas to control erosion
Mortality/stress of vegetation due to sediment deposition, resulting in reduction or deterioration of wildlife habitat	- sediment control measures	Down slope from eroding areas
Stress of vegetation due to soil compaction	- avoid use of heavy equipment in areas of significant natural vegetation and under trees	As a general practice
Changes in vegetative composition as a result of loss of topsoil and subsoil or mixing	- restore site by replacing soil in preconstruction horizons	In eroding areas during construction, stockpiles
Removal or disturbance of significant trees and/or ground flora	- avoid these areas - employ tree protection measures	During construction phase of any project
Effects of accumulated heavy metals and other contaminants on vegetation, having possible deleterious effects on wildlife	- planning consideration of sludge disposal sites - improved sewage effluent - operation and storage precautions at treatment facility/pumping station	At point of sludge disposal/utilization and of effluent discharge

Environmental Concern	Remedial Measure	Application (Where/When)
New or increased exposure of forest edge with resultant effects of windthrow, leading to increased loss of habitat for wildlife	- avoid woodlots and similar areas	During construction phase of any project
Mortality/stress due to changes in soil moisture conditions, resulting in loss of wildlife habitat	- avoid poorly drained areas - use of appropriate backfill materials - revegetate using indigenous species able to survive new conditions	During construction of sewers
Destruction of wildlife habitat from actual construction	- avoid areas of existing habitat - restore site or create similar habitat elsewhere	Construction of any project
Road salt contamination	- contained storage	Patrol yard. Winter maintenance facility
Heritage Resources		
Deterioration of sites or structures having archaeological, historical or architectural values, as a result of environmental changes	- employ necessary steps to decrease harmful environmental condition changes such as air pollution, vibration, altered water table, etc.	Where appropriate with respect to archaeological, historical or architectural resources
Unwanted increase in public access and potential vandalism	- fence off area of concern - prevent public access	Where appropriate with respect to archaeological heritage resources

Environmental Concern	Remedial Measure	Application (Where/When)
Threatened viability of or opportunity for retention of sites with heritage value	- avoid these areas	Where appropriate with respect to archaeological heritage resources
Disruption or destruction of features having archaeological, historical or architectural values as a result of the undertaking	- avoid if possible or arrange for the salvage of data	Where appropriate with respect to archaeological, historical or architectural resources, ensure sufficient time is available for such an operation
Agricultural		
Removal of productive farmland	- design facilities so as to minimize land requirements and construction disturbance; rehabilitate disturbed areas	In rural areas
Disruption of field access	- provide alternative access points at critical times	In rural areas
Disturbance of livestock by noise and dust during construction	- employ noise and dust control measures	In rural areas
Disruption of tile and surface drainage systems	- stage construction work - restore tile and surface drainage system	In rural areas

Environmental Concern	Remedial Measure	Application (Where/When)
Effects on crops of contaminants from runoff and sludge disposal sites	- monitor sludge content to control amount of contaminants being disposed of on farms	In rural areas
Residential, Institutional, Commerce and Industry		
Disruption of pedestrian movements between adjacent uses	- maintain continuity of pedestrian walkway system as much as possible	As a general practice
	- provide walkway strips to adjacent residential areas	Where suitable
	- provide crosswalks and sidewalks at access points	Where suitable
Facilities inconsistent with or disrupt character of area	- preserve existing amenities as much as possible	As a general practice
	- landscape access points, vicinity of structures, buffer areas	Where suitable
	- design and site structures to blend with adjacent building forms and materials	As a general practice
	- provide lookouts	Adjacent water bodies or open spaces
	- grade area to pleasing lines, utilize berms	Where suitable

Environmental Concern	Remedial Measure	Application (Where/When)
Temporary disruption during construction and/or inconvenience to users of adjacent properties and building	- notify public agencies and adjacent owners of construction scheduling	Where substantial inconvenience or disruption to adjacent uses would be experienced and where measures would substantially reduce effects
	- prepare `emergency program´ to ensure quick resolution of servicing problems	
	- consult with public agency and/or adjacent landowners regarding temporary access rerouting	As a general practice
	- schedule construction so as to minimize period of disruption in proximity of adjacent uses and structures	As a general practice
Removal of residences and other buildings within expansion area	- coordinate removal program to minimize inconvenience	As a general practice
Structural damage due to land subsidence	- remedial work on foundations	Groundwater withdrawals
Outdoor Recreation		
Temporary disruption of open space activities during construction	- employ noise and dust control measures - staging of construction to cause least disruption	In areas within or adjacent to public open space

Environmental Concern	Remedial Measure	Application (Where/When)
Effects of physical changes in layout of recreation uses due to property loss	- compensate elsewhere	In areas within or adjacent to public open space
Aesthetics		
Removal of vegetation	- restore area to preconstruction conditions	In all areas of construction
Construction and culverting in watercourse valleys	- restore all disturbed areas to as natural a condition as possible	As a general practice, where applicable
Adjacent residents exposed to new view	- design new structures to blend in with existing environment	In all areas of construction
Dust during construction	- control dust on site by such methods as watering, limiting exposed areas, etc.	Where adjacent uses or natural vegetation could be adversely affected
Community Disruption		
Community perception of condition changes occurring	- ensure all remedial work undertaken in keeping with community objectives and perception of community features	As a general practice

Environmental Concern	Remedial Measure	Application (Where/When)
Noise and Vibration		
Increased noise levels during construction	- ensure contractor abides by municipal Noise Control By-Law	Construction supervision
	- utilize special noise reduction equipment on construction machinery	Where substantial noise level increases will be experienced affecting adjacent uses and where substantial attenuation is possible
	- limit construction period to day time hours	
Increased noise levels from treatment facility and/or pumping station	- reduce noise levels e.g. insulate treatment facility, install noise barriers, or berms, plant vegetative screening, enlarge buffer area	Where substantial noise level increases will be experienced affecting adjacent uses and where substantial attenuation is possible
Public Health		
Exhaust emissions from construction equipment and vehicles	- minimize operation on site, control location on site	Where adjacent uses or natural vegetation could be adversely affected
Particulate matter and gaseous emissions from treatment facility (e.g. sludge incineration)	- modify design of facility - review operational practices	Where appropriate

Environmental Concern	Remedial Measure	Application (Where/When)
Odour causes public nuisance, e.g. lagoon	- modify design by adding aeration equipment	Where appropriate
Effects of groundwater elevation on existing subsurface sewage disposal systems	- monitor groundwater levels and, if necessary, take appropriate action	Where appropriate
Groundwater contamination	- construction refueling precautions - landfill design and operation precautions - precautions in operation and storage at treatment facility, pumping station	On site generally
Effects of emergency by-passing of sewage	- contact potentially affected government agencies and public downstream within 24 hours of by-pass event	In all cases

APPENDIX VII

ENVIRONMENTAL CONSIDERATIONS FOR PLANNING THE CONSTRUCTION OF PROVINCIAL SEWAGE AND WATER PROJECTS

Fourth Edition

January, 1985

Ontario Ministry of the Environment

INTRODUCTION

The intent of these Guidelines is to provide direction and assistance to the Ministry of the Environment and its agents in planning the detailed design and construction of Provincial sewage and water projects. The guidelines recommend construction procedures that are considered to be consistent with sound environmental practice. They are also intended to inform the public of MOE's recommended practice.

As a matter of standard practice and as a condition of approval under the Environmental Assessment Act of MOE's Class Environmental Assessment for sewage and water projects, MOE will ensure that sewage and water projects are implemented in a manner consistent with these Guidelines.

Some of the items in these Guidelines may have to be expanded or changed for specific projects. Such changes will be documented in the E.S.R. Guidance for such changes will come from MOE in consultation with any potentially affected ministries, agencies, or the public.

Mitigation measures are not without cost. What is practical in terms of technical execution may not be viable in terms of cost benefit. Sometimes trade-offs have to be made, as it is not always possible to provide needed service on the basis of protection of the environment at all cost. Such trade-offs are to be documented in the E.S.R. for the project.

The designer is to be aware that from a construction administration viewpoint, the mitigation procedures must be specific, practical in execution and possible to cost and price by the contractor. Vague, or motherhood statements in the specifications, will result in provisions being difficult to enforce, being ignored or being overpriced because the contractor will not know what is expected of him.

It should be noted that this document is a guide which should be read in conjunction with the sections dealing with environmental considerations which are contained in the Provincial Standard Specifications.

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1.0 COMMUNICATIONS AND INFORMATION TO "LANDOWNERS"

During the design phase of the project (Stages 3 and 4) and prior to implementation (Stage 5) the proponent may choose to advertise and hold public information centres to obtain comments on the proposals (see Section 3.3, page 47 for further information).

1.1 In addition to any information centres, the proponent or its agent, when performing work on a municipal ROW, will inform by letter the ratepayers in the affected area. This letter will be sent out at least 30 days prior to commencement of construction.

Generally, this letter provides the following information:

- Commencement date of construction.
- Type of work carried out.
- Name of contractor.
- Name of consultant.
- Advice on kind of contact the individual can anticipate to receive and reasons for it, e.g. location of service connection, access to property, temporary termination of utility services.

A typical letter is attached as Appendix "A".

1.2 In selecting easements, locations and development sites consider the implications for areas where significant impacts will occur from land use disruption, e.g. golf courses, parkland.

The proponent or its agent, when performing work on easements, utility easements or freehold lands (e.g., pumping station site, treatment works site) will inform by letter adjacent or abutting owners. This letter will be sent out at least seven days prior to commencement of construction.

In addition to the same information as outlined in Section 1.1, a more detailed construction schedule will be made available by letter.

Where longer notification times are required, they are subject to special conditions of the easement and will be handled on a specific basis.

For large scale projects, which affect a large number of landowners, a "Landowners Handbook" will be considered.

1.3 Landowner compensation shall be established prior to any construction that affects the property, except in cases where the property has been expropriated.

Prepare a comprehensive inventory of all site features, particularly in urban areas, including fencing, plantings, landform features and paving in conjunction with the landowner to determine fair compensation and/or restoration parameters.

Landowner compensation shall be established prior to any construction that affects the property. Landscape plans shall be prepared in areas where extensive restoration is required.

2.0 WORKING AREAS DELINEATION

The following requirements apply before construction activities commence:

2.1 The boundaries of the working area shall be delineated through the use of stakes, snow fencing, farm fencing, or hoarding, as appropriate.

2.2 Snow fencing shall be placed between construction easements and all water courses, marshes, sensitive areas, trees and shrubs identified for protection, to protect those areas and items from construction activities and equipment. The areas referred to might include: livestock grazing areas, and areas where public safety is of concern. The items referred to specifically include trees and shrubs except those designated for removal. Trees are to have snow fencing installed at the "drip line" or at greater distance from the trunk if necessary. In urban areas, snow fencing will be installed along the drip line where practical.

In some situations on-site approval of snow fencing by the Engineer shall be required.

3.0 CONSTRUCTION WORKYARD AND ACCESS ROUTES

All equipment and materials shall be stored in an orderly manner and in locations acceptable to the Ministry.

Temporary workyards may be required to serve as sites for storage of material and equipment, maintenance, and miscellaneous work operations, employee parking, and field administration centre.

3.1 The amount of land cleared to establish a construction yard, additional working area, or access route(s) should be kept to the minimum area practical. Work yards should be as close as possible to main roads for delivery of material and equipment. Location and design of workyard and access roads shall consider present and future land uses.

In cases where the proponent owns or leases the land for the workyard and/or access road, the treatment required to mitigate environmental damage will be specified in the tender documents, which will include any special terms and conditions under the lease.

In cases where the contractor arranges a lease for the establishment of temporary workyards or access roads, the restoration will be subject to the terms and conditions of the agreement between the two parties. The contractor must obtain from the landowner(s) of the areas to be used, a written agreement setting out terms of any waivers or leases arranged for access roads and work areas. This agreement is to be submitted to the Engineer prior to the utilization of access roads or work areas.

3.2 An adequate access route at appropriate locations must be available to cross the right-of-way/easement or temporary work area during all phases of construction so as not to inhibit movement of equipment or animals in an agricultural setting, or people and vehicles in an urban setting. Any open trench for excavation shall be fenced to prevent ready access by the public, livestock, and other domestic animals.

3.3 For safety purposes, public access to the construction yard should be restricted. This may require hoarding, a barrier, or a gate with a lock if necessary, at the entrance.

3.4 The site should not constitute a traffic hazard created by incoming and outgoing vehicles. Warning signs should be erected at all approaches to construction areas. Intersections of access roads to construction sites should be identified to warn traffic of slow moving equipment which may be turning on or off main roads. Access roads should be designed to accommodate anticipated loads and types of vehicles which are necessary for construction activities (see also Clause 6.5).

3.5 Protection of public road surfaces shall be provided where construction equipment is utilizing these facilities and any damage shall be repaired to the satisfaction of the respective road authority.

4.0 EQUIPMENT FUELING, MAINTENANCE AND STORAGE

4.1 Equipment fueling and maintenance and storage shall be done in such a manner that no fuels, oils, chemicals, and other toxic materials can gain access to surface or ground water.

The contractor shall undertake a detailed review of his proposed route of construction to plan access routes and fueling areas. Fuel storage, refueling and maintenance of equipment shall not be undertaken in or adjacent to watercourses. Suitable fueling and maintenance areas shall be established and all maintenance and fueling conducted in these areas. The locations of such areas are subject to approval by the Engineer.

The exception to this fueling location requirement shall be generators, cranes, backhoes, or shovels, dredges, draglines, and pumps, which may be fueled at other than the designated fueling area. No fueling of equipment, however, shall be carried out within thirty (30) metres of any watercourse. This requirement may be relaxed at the discretion of the Engineer if acceptable non-spill fueling facilities are used.

4.2 There shall be a contingency plan for the containment and rapid clean-up and disposal of spillages (land and/or water) that occur. Procedures for the interception and rapid clean-up and disposal of spillages that do occur shall be submitted to the Engineer for review and approval prior to starting work. Materials required for clean-up of fuel spillages shall be maintained in a readily accessible and usable state on site and shall be capable of handling maximum volume of liquid which may be spilled.

4.3 Any spill that could cause impairment to the natural environment must be immediately reported by the Engineer to the local MOE District Office.

4.4 Small amounts of waste from equipment servicing and maintenance may be disposed of at an approved waste disposal site. Large amounts of waste or excess oil or fuel shall either be brought to a collection system, saved for future use, or returned to the supplier.

Wherever disposal of toxic wastes is contemplated, the local MOE District Office shall be contacted for direction on disposal requirements.

4.5 The cleaning of equipment in streams and lakes and the emptying of fuel, lubricants and solvents into watercourses is prohibited.

Construction equipment shall be cleaned prior to entering public roadways to minimize the tracking of mud and creation of dust.

4.6 Exhaust emissions from equipment shall be minimized through effective machine maintenance.

5.0 MUD, DUST AND PARTICULATE CONTROL

5.1 Dust control measures shall be undertaken to prevent dust nuisances resulting from any phase of construction operation.

Public roadways shall be kept clean and free of mud.

Construction equipment shall be cleaned prior to entering public roadways to minimize the tracking of mud and creation of dust.

Permitted dust control measures may include the application of calcium chloride, brine, or water. In general, the use of calcium chloride or brine shall be minimized and restricted to vehicular rights-of-way.

In close proximity to watercourses and land to be used for agriculture, water applications only should be used. (See also Section 11.5.)

5.2 In extreme cases, dust may become more of a hazard than a nuisance. On roads, for instance, dust may affect visibility and constitute a safety hazard.

Water should not be applied in amounts large enough to cause erosion from runoff.

Wood chips or gravel may be useful and a lasting solution to dust problems in small, heavy use areas such as turnouts and truck loading and dumping areas.

5.3 Dusty materials shall be transported in covered haulage vehicles.

5.4 Temporary seeding (e.g. of stockpiles left for long periods) and restrictions on crop/vegetation removal in easements can be considered as dust control measures in certain situations.

6.0 NOISE AND VIBRATION CONTROL

6.1 Noise levels shall be controlled in accordance with local by-laws.

Construction activities involving loud noise and vibration should be scheduled to avoid endangering wildlife, particularly at critical points in their life cycle.

6.2 The construction work shall normally be restricted to day shift; e.g. 0700 hrs to 2000 hrs on weekdays only.

Should the scheduling of work need clearly audible operation beyond this time limit, the contractor shall require special permission from the local municipal council or its designated authority.

If proper noise attenuation can not be achieved and special permission is granted, the landowners should be given prior notice of any noise disturbance.

6.3 All vehicles and equipment shall be equipped with effective muffling devices and shall be operated in a fashion to minimize noise levels in the project area.

Equipment manufactured after January 1, 1979 shall be in compliance with Publication NPC-115, Construction Equipment, as amended.

6.4 Notwithstanding Clause 6.3, noise attenuation devices (barriers) shall be placed around pumps, compressors, and other stationary sources of loud noise. For compressors and pumps operated beyond normal working hours, special measures for noise attenuation shall be required.

6.5 The routes used for truck traffic related to the construction shall be selected by the municipality according to the best traffic pattern. Truck traffic shall not be directed through quiet zones or residential areas unless with municipal permission.

Truck traffic to the construction site shall be restricted to the working hours stated in Clause 6.2. Emergency and maintenance crews and their vehicles are exempted from the requirements of Clauses 6.2 and 6.5.

6.6 Control of noise and vibration from blasting operations shall be in accordance with Publication NPC-119, Blasting, as amended.

7.0 DRILLING AND BLASTING

The designer shall conduct a general survey to establish the location of any structures in relation to the blasting area and the general condition of such structures.

7.1 When drilling and blasting operations are carried out in the vicinity of populated areas, these activities shall be carried out during normal working hours (e.g. 0700 and 2000 hours of weekdays). When it is necessary that such activities be undertaken outside normal working hours and over extended periods of time, adjacent local residents potentially affected are to be given prior notice.

7.2 Drilling and blasting operations shall be scheduled to avoid endangering fisheries and wildlife, particularly at critical points in their life cycle such as reproductive migrations.

7.3 Dust control measures shall be instituted to minimize air pollution.

7.4 Studies shall be conducted on the potential impact of blasting on the local groundwater system, when preliminary soils information determines that blasting will have an impact. Site specific guidelines for well monitoring in locations where blasting may affect water supplies, may be required.

7.5 Blasting shall be undertaken in such a manner as to minimize the effects on local wells and streamflow. Whenever possible, water wells and quality in wells within 300 m from the proposed blasting should be monitored prior to blasting.
(See Clause 12.1).

7.6 For control of noise and vibrations from blasting operations refer to Clause 6.6.

8.0 PROTECTION OF LAND FEATURES AND VEGETATION

An inventory of vegetation in sufficient detail is an important tool to determine the value of the vegetation and to determine the appropriate mitigation procedures.

In rural woodlands and valley lands, a general inventory includes species composition, overstory tree diameter (DBH), overstory tree height, drainage and a general description with comments on the susceptibility of vegetation to contruction related impacts.

In urban and environmentally sensitive areas, where the preservation of specific trees is important, a tree inventory should identify individual specimens and record species, tree diameter (DBH), tree height, condition and requirements for preservation.

Techniques for achieving protection of land features shall appear in the construction specifications and drawings.

The following procedures shall be followed:

8.1 For vegetation to be protected in situ:

- Erect snow fencing around drip line of trees within working area.
- Do not stockpile material within drip line.
- Do not allow traffic, vehicles or equipment to compact soil within drip line.
- Prune interfering branches and treat with approved dressing.
- Do not cut tree roots.
- Tunnel under or around roots by hand digging without damaging roots.
- Treat any damaged roots over 25 mm in diameter immediately with approved tree paint.

8.2 When raising grades in vicinity of vegetation to be protected:

- When fill is less than 400 mm deep, place clean washed gravel around tree trunk to a minimum radius of 450 mm and approximately 50 mm above finished grade.
- Use gravel graded 25 mm to 50 mm in size.
- Place gravel before earth fill.
- Do not leave earth fill in contact with trunks.
- When fill is more than 400 mm deep, depending upon the circumstances, the vegetation could be removed and replanted to match finished grade, a well could be formed around the trunk using steel, wood, brick or stone retaining structures, and/or a watering/feeding/ventilation system could be established during filling operations utilizing tiles.

8.3 When lowering grades in vicinity of vegetation to be protected:

- Provide broad rounded mounds for trees to be preserved and located above finished grade.
- The amount of cutting within drip line should be minimized. This may involve leaving irregularly shaped mounds.
- Cut all exposed or broken roots greater than 25 mm diameter clean, treat with approved dressing and cover with top soil.

8.4 Transplanting vegetation from the easement requires proper planning and detailed specifications to ensure a reasonable rate of survival. The specifications shall include the following items - root ball size, planting pit size, soil mixtures, stakings and guying, pruning, mulching, fertilizing, moisture loss retardants and root and crown pruning in advance of transplanting.

9.0 CLEARING RIGHTS-OF-WAY/DISPOSAL OF EXCESS MATERIAL

9.1 Grubbing and topsoil stripping shall not be permitted on any slopes or soils where soils may be sensitive to erosion (especially where the slopes are adjacent to watercourses) more than two days of production in advance of trench excavation (see also 10.2 and 13.5).

In all other areas, keep clearing and grubbing to a minimum slightly in advance of construction.

9.2 The topsoil stripping, storage and restoration procedures should preferably be prepared based on soil surveys and the intended end use of the site.

In locations where topsoil preservation is required, e.g. agricultural and natural lands, the topsoil should not be stripped in a wet or frozen condition. Topsoil and subsoil shall be piled separately to avoid mixing. Restoration procedures shall consider chisel ploughing, subsoiling, fertilizing, heavy mulching and the use of soil building cover crops.

A monitoring program of soil nutrients, organic matter, and density/compaction may be necessary to determine the condition of restored soils in selected areas.

Stockpiled material must be located away from watercourses and must be stabilized to prevent erosion. Where such measures are necessary and siltation of watercourses is possible, straw bale containment devices, perimeter ditching or contour ploughing should be employed to prevent soil erosion.

9.3 All cleared, grubbed, and excavated material shall be disposed of in accordance with the procedures described in the following sections. At no time shall excess fill be disposed of in watercourses, drainage ditches, or floodplain areas without the permission of the appropriate authority having jurisdiction (e.g. local Conservation Authority, Ministry of Natural Resources or Municipality).

9.4 Excess excavated material, stones, construction debris, cleared vegetation, must be disposed of in a manner acceptable to the Engineer.

Wherever possible, first option of spoil material shall be made available to the landowner or the municipality.

Arrangements for other disposal sites shall be made by the contractor if the municipality or the landowner cannot make use of surplus excavated materials.

Cleared vegetation will be chipped or burned or stacked along the easement edge when specified in the contract documents for wildlife habitat enhancement and body wood will be cut in cord length and stacked along the easement.

9.5 The contractor must obtain from the landowner(s) of areas to be used for disposal a written agreement setting out terms, conditions, and ultimate responsibility for the materials to be disposed and locations for disposal. This agreement is to be submitted to the Engineer prior to utilization of the site.

The Engineer will arrange to have the Regional Environmental Officer of MOE do an inspection of the disposal site prior to and after disposal operations are completed.

10.0 SITE DRAINAGE AND EROSION CONTROL

10.1 Site grading or other measures shall be taken to prevent runoff water from draining into the pipe trench.

10.2 The extent of removal of vegetation from slopes and near watercourses shall be minimized. Ten-metre (minimum) vegetation strips shall be maintained between the construction easement and the watercourse until trenching and pipe laying are imminent. This area is to be extended to the tops of any adjacent slopes where there is potential for erosion of soils to an adjacent watercourse (see also 9.1 and 13.5). These areas are to be designated on the contract drawings.

10.3 Provision shall be made to intercept and divert site drainage, at short distance intervals, into natural channels, infiltration ditches, settling ponds, or areas of suitable and stable ground cover.

10.4 There are situations where settlement ponds or impoundment areas should be required and designs included in the contract documents, such as:

- at locations where the excavation of well points using water jets will produce large quantities of turbid water
- at stream crossing locations where extensive dewatering is anticipated
- at locations where oil contaminated water may be pumped from tunnel excavations.

Appropriate sedimentation retention measures shall be provided where necessary to ensure that sediment discharge to watercourses or adjacent land is minimized. These measures will be included in the contract documents.

In special cases, the designer should contact the local offices of MOE and MNR and/or local Conservation Authorities to discuss sedimentation avoidance and/or retention measures.

11.0 DEWATERING

Dewatering is the removal of impounded or ground water from the construction area. As a result of exposure to various soils and construction materials, such impounded water may have high concentrations of suspended sediment or may be contaminated with high nutrient content and/or toxic substances. If toxic substances are involved, the Ministry of the Environment should be contacted and provided with information of the contaminants, concentrations, and the proposed method of handling these materials.

To prevent such water from affecting the water quality of watercourses, the following techniques are to be used:

11.1 Whenever possible, suspended solids shall be allowed to settle prior to such water being pumped out of an impoundment. Settled solids (silt) may be removed, if necessary, after water has been pumped out and disposed of at an approved location.

11.2 If time does not allow for suitable settling of turbid waters within the impoundment, water shall pass through a sediment barrier. For small scale operations, this can be achieved by pumping the water onto a suitable, stable cover area and allowing for filtration of sediment through the ground cover. Berms of straw bales or other suitable materials may be used to slow runoff and encourage infiltration. These forms of sediment barriers must be checked periodically and replaced when they become saturated with silt. Larger scale operations may require special designs.

11.3 When continuous pumping of turbid water is undertaken, it may be necessary to construct a sediment basin through which the water can be passed. A splash pad where the pumped water is discharged will assist in reducing surface erosion.

11.4 Discharge of dewatering operations to existing storm sewage works shall only be allowed if the discharge meets the requirements of the Municipal Sewer by-law.

11.5 If the water removed during a dewatering operation is greater than 50,000 litres per day from any ground water source, a water taking permit, issued under the Ontario Water Resources Act, must be obtained by the contractor from the Regional Office of the Ministry of the Environment.

The designer shall contact the Regional Office in cases when a water taking permit for dewatering operations is anticipated to discuss any possible impact with water taking and discharge, and possible conditions which may apply to the permit.

12.0 GROUNDWATER AND WELLS

12.1 A water level and water quality survey of wells in the zone of influence of trenching operations should be carried out during final design and monitored during construction. The condition of existing wells shall be established prior to commencing construction. Observation wells for recording changes in quantity/quality may be established using existing wells or drilling new shafts where potential problems could arise.

12.2 A contingency plan shall be worked out prior to commencement of construction to minimize inconvenience, should it be necessary to provide water for the "landowner".

12.3 Landowners experiencing temporary interference shall have water made available to them until groundwater conditions return to normal or service is reinstated.

Landowners experiencing permanent interference shall have their water wells or supply services restored (e.g. new well or an extention of municipal service).

13.0 STREAM CROSSINGS AND CONSTRUCTION THROUGH SENSITIVE AREAS

In the design phase the following is to be considered:

- timing of construction should avoid interference with fish migration, spawning or egg incubation
- there should be no blasting in or adjacent to watercourse beds during fish migration, spawning or egg incubation. Devices such as air curtains may be required to minimize the impact of blasting in water bodies at other times
- construction operations should be timed to avoid recreational lakes or rivers during peak-use periods

Detailed contract specifications and drawings for each significant stream crossing, intake or outfall, and sensitive area must be prepared during final design as part of the general specifications and drawings, and submitted to the Ministries of the Environment, Natural Resources, and the local Conservation Authorities for review. Other parties may be included if required. The contract documents are to reflect any restrictions imposed on the scheduling and/or methods of construction.

The contractor shall submit to the Engineer 30 days prior to construction, his detailed procedures and schedule for review. The Engineer shall consult with the appropriate authorities if there is any question of compliance of the proposed procedures and schedule with the contract documents. The contractor shall not proceed without the written approval of the Engineer.

The Engineer is to forward to the nearest offices of the Ministries of Natural Resources, Environment, and the local Conservation Authority the following information:

- The date that construction is anticipated to start, together with the proposed schedule of construction activity, including mitigative and site restoration activities.
- A weekly report of progress of construction activities only if requested.
- Notice two (2) days prior to initiation of work in watercourses and other sensitive areas identified by the above-referenced agencies.

The following guidelines are to be incorporated into the contract documents where applicable.

13.1 Before construction at the watercourse crossing begins, all equipment and materials required must be on site and ready for use.

Prior to commencement of construction, the contractor shall obtain information on anticipated weather conditions to ascertain that reasonable conditions will prevail for the duration of the work in the stream crossing. The construction should not proceed if unfavourable conditions are forecasted in the watershed.

The time from excavation to restoration shall be kept to a minimum.

Maximum construction times for all elements of the work within the stream crossing and floodplain shall be detailed in the contractor's schedule and procedures.

13.2 The locations at which vehicles and heavy equipment may cross the river shall be identified in the specifications. (Vehicle crossing restrictions shall be stated to the extent possible.) At no time shall the streambed be used as a vehicle or equipment route except for those crossings specified. Crossings shall be as perpendicular to the river as possible to minimize in-stream disturbances.

Vehicles may ford streams if water levels are low enough and if the streambanks and beds are composed of erosion resistant material. The use of wooden, rubber, or gabion mats is encouraged to protect the stream banks. Where the fording areas and banks are prone to erosion, suitable stabilization will be required before use of this crossing to minimize stream muddying. Transport of equipment around watercourse via local roads should be considered as an alternative to the construction of new access crossings.

13.3 Bridging or fording installations for temporary stream crossings shall be made on existing natural grade where possible, with minimum disturbance to the channel. These installations shall be protected by erosion resistant materials, e.g. sandbags.

13.4 Materials excavated from the watercourse must be removed and disposed of in a manner that will ensure minimum possible siltation to the watercourse.

13.5 The removal of vegetation from the right-of-way shall be kept to the minimum width necessary for construction.

13.6 Aquatic weeds uprooted or cut prior to or during trenching operations must be contained and adequately disposed of on land.

13.7 If a diversion channel is required, it shall be suitably sized and stabilized before the stream is diverted. Potential erosion sites in any emergency spillway, drainage or diversion channel, shall be protected with rip rap, sand bags, or other resistant material.

A water-taking permit is required prior to the construction of a stream diversion channel or temporary coffer-dam for purposes of water storage (see 11.5). The permit requires that adequate downstream flow be maintained at all times to ensure the satisfactory continuation of downstream water uses, and to ensure the preservation of plant and animal life in the stream channel.

13.8 Temporary coffer-dams and diversion channels should be designed to withstand any short-term or seasonal floods. The necessary equipment and materials should be readily available for remedial work to any dams in the event of an emergency situation. Stable material such as coarse gravel, broken rock, and sand bags is preferred over loose sand, loams and organic soils in the construction of such dams. Erodible material on the sides of the coffer dams must be protected against current action with rip rap, sand bags, or other protective material.

13.9 Prior to the preparation of the contract documents, an analysis of the characteristics of stream bed soils (to the maximum expected depth of trench) shall be undertaken. The purpose of this analysis is to allow:

(a) predetermination of acceptable construction techniques to be employed;

(b) predetermination of acceptability of the excavated materials for backfill. This analysis shall include:

-excavated material types and volumes (clay, silt, etc.)
-particle size and volumes
-contaminants such as PCB, mercury, high nutrient content, etc.

Excavated materials from the bed of the watercourses not suitable for backfilling the trench shall be removed and deposited on land.

Disposal locations and methods for spoil material containing contaminants shall be identified in the contract specifications and drawings. The run-off from such spoil shall not be allowed to re-enter the surface waters. Ditches or berms may be constructed to prevent run-off. Locations where use of this technique is not possible must be identified and acceptable alternative strategies identified.

The same or similar procedures will have to be followed during the preparation of contract documents for intakes and outfalls.

13.10 Clean material must be used to cover the pipe as soon as it is laid across the watercourse and the streambed protected from erosion.

Streambanks and beds that have been disturbed during construction must be stabilized immediately after construction to prevent erosion.

In the event a "bypass" or "dry" construction technique is used, beds and banks of streams shall be reinstated and stabilized prior to removal of temporary installations.

13.11 In sensitive areas, cut-off walls or subsurface berms shall be used to prevent the creation of a "french drain effect" in the trench.

14.0 HYDROSTATIC TESTING AND DISINFECTION

For the purpose of hydrostatic pressure testing of sections of newly constructed water/sewage works, the taking of water from surface or ground sources in excess of 50,000 litres a day must be authorized with a water-taking permit issued under the Ontario Water Resources Act. Applications are available through the respective Regional Offices of the Ministry of the Environment, and must be submitted at least six weeks in advance of any hydrostatic test.

14.1 The terms and conditions of a permit require that the filling of the pipeline from surface sources be carried out in such a manner that stream flow is not stopped or reduced to a rate that will interfere with downstream uses or with the natural functions of the stream. For proposed takings from sources in low-flow stages, the issuance of a permit may be refused until a period of higher flow, or the proposed rate of taking may be proportionally reduced as required.

Hydrologic studies may be required to determine whether sufficient water will be available from local watercourses and to recommend alternative water supplies if necessary.

14.2 The discharge of water from water/sewage works should conform to the following:

(a) The linear velocity of discharge should not produce scouring of stream channel or lake bed. A splash pad installed at the discharge will help to prevent erosion.

(b) The quality of water returned to the watercourse or lake should be substantially the same as the water withdrawn.

(c) The discharge of chlorinated water shall be in accordance with Section 8 of Bulletin 65-W-4, Chlorination of Potable Water Supplies (March 1980).

15.0 SITE RESTORATION

15.1 Restoration on easement shall restore the property to a condition at least equivalent to the state of the land prior to construction. Any special conditions affecting the land will be negotiated with the property owner at the time the option is obtained and will be included in the contract documents.

Restoration work on the municipal right-of-way shall restore the right-of-way to a condition at least equivalent to the condition prior to construction. Any special restoration measures will form part of the contract documents.

Studies of the appropriate seeding and planting in natural areas may be required to ensure a rapid recovery of easement lands to the pre-construction state.

15.2 Restoration shall immediately follow construction if feasible. When it is not practical to carry out full restoration, interim measures shall be provided until full restoration can be implemented.

15.3 All surface features damaged during construction or designated to be replaced shall be restored as nearly as possible to the original condition.

15.4 It is essential to prepare and/or replace tile drainage systems to their original condition. Discussions with appropriate parties shall be entered into by the Engineer during the design phase so that the extent and location of tile drainage systems can be determined.

16.0 PROJECT MONITORING AND INSPECTION

Monitoring and inspection provides an accounting mechanism for proponents, consultants, contractors, Government agencies, and the public to learn from success and failures associated with the implementation of the undertaking.

A good monitoring and inspection programme promotes continuous improvements in project planning and construction. This could decrease the incidence of environmental damage and could potentially avoid contentious issues and possibly prosecutions. It also has the beneficial effect of increasing the credibility of the proponent.

Monitoring and inspection ensures that there is direct feedback from what is actually experienced in the field to what was predicted in the project planning stage. Thus, the Environmental Study Report (ESR) impact predictions can be re-evaluated and improved from project to project. Also, unexpected impacts that occur during a project's implementation can be identified and action taken to mitigate negative effects. Monitoring is one mechanism whereby the need for an Addendum to an ESR can be identified.

The examination of impacts on a more scientific and quantifiable basis can lead to a better knowledge and decision-making concerning the level of extent of mitigation necessary to ameliorate negative environmental impacts and enhance the benefits associated with an undertaking.

16.1 The Environmental Study Report (ESR) will provide an accurate description of conditions which exist prior to the implementation of the undertaking. The anticipated effects of construction of the undertaking and the proposed actions to mitigate those effects will be predicted.

The ESR will outline a programme which will monitor the key impacts expected to be associated with a project's implementation. If no significant impact, positive or negative, is predicted, which could frequently occur with minor extensions to sewage and water projects, the ESR would indicate that the proponent does not foresee a need to monitor key impacts since none has been identified and a monitoring report will not be prepared.

Where no significant impact is anticipated but there is an unforeseen occurrence or impact, the proponent or his agent shall contact the affected parties to determine the significance of the impact. If after consultation the impact/change is considered significant, an addendum to the ESR will be prepared. The addendum will be filed with the ESR and notice will be given immediately to all affected parties in order to allow affected parties to review the proposed change and respond to the proponent. The change can be instituted following the termination of the review period.

If a monitoring and inspection programme is considered necessary, the proponent will be responsible for outlining in the ESR a programme that satisfies the following requirements:

- A definition of the objectives of the monitoring and inspection programme.

- A clear indication of the key impacts predicted that will be monitored during and immediately following construction; i.e. maintenance period.

- An outline of the information required to evaluate the cause and effect of each impact to be monitored in order that the successes and failures of the measures selected to avoid or mitigate the predicted adverse environmental effects of the undertaking during all phases of construction, can be examined.

  This shall include, but not be limited to, the frequency and timing of surveys, location of monitoring sites or areas, methods of data collection, analysis and evaluation.

- The expected reporting production format and date(s) of filing shall be identified in the ESR.

For major projects, it may be necessary to hire an Environmental Inspector, who will report to the Engineer or his designated agent and assist the Engineer in his responsibilities to ensure that the environmental mitigative measures as outlined in the contract documents, will be followed by the contractor. The responsibilities of the Environmental Inspector will be outlined in the ESR. In most instances, the Environmental Inspector could then also be responsible for the preparation of the monitoring documentation.

16.2 Monitoring documentation shall be prepared based on the requirements outlined in Section 16.1. This monitoring documentation shall draw conclusions and make recommendations.

In certain instances, it may be necessary or be desirable to submit monitoring documentation during the construction phase. The documentation may be in the form of a report(s) or letter(s).

All monitoring documentation shall be filed in the public records at the same location as the ESR for the specific undertaking to which it applies.

APPENDIX VII-A

Date: _____

Project No: _____

TO: PROPERTY OWNER OR RESIDENT

RE: Provincial Program

The Ministry of the Environment has awarded a contract for the installation of a _____ system in your municipality to _____.

The Design and supervision of the work is under the control of _____.

In the near future, a representative of the consulting engineer will contact you regarding the location of the service connection to your lot. As you are probably aware, the Contractor will install the service connection in your lot at the property line - it is your responsibility to determine the best location for your connection, and eventually to complete the connection to your dwelling.

While construction is in progress, some inconvenience to local vehicular traffic will be unavoidable, but the construction schedule will be arranged such as to reduce this to a minimum. When installation of services takes place on your street, there may be a short period during which you will be required to make alternate parking arrangements to allow for the restoration of driveways and other accesses.

Should you have any questions, problems or complaints, please contact the consultant's Resident Engineer or Inspector.

If you are unable to reach the Resident, please leave a message at the Municipal Office and you will be contacted in due course.

It is important to note that private connections must not be installed from the property line to the dwelling until such time as the total system is complete and until you have obtained a "permit" from the Municipality.

With everyone's co-operation, it is hoped that the installation of these vital services will proceed smoothly and despite occasional unavoidable inconveniences, will result in a satisfactory system for the betterment of the whole community.

Yours very truly,

Project Supervisor
Environmental Approvals and
Project Engineering Branch.

APPENDIX VII-B.1

TELEPHONE NUMBERS OF MOE REGIONAL AND DISTRICT OFFICES

Southwestern Region	
London Regional Office	661-2200
Windsor District Office	254-2546
Sarnia District Office	336-4030
Owen Sound District Office	371-2901
Clinton-District Pesticides Ofcr.	482-3428
West-Central Region	
Hamilton Regional Office	521-7640
Cambridge District Office	623-2080
Welland District Office	735-0431
Central Region	
Toronto Regional and District Office	424-3000
Barrie District Office	726-1730
Muskoka-Haliburton District Office (Gravenhurst)	687-3408
Peterborough District Office	743-2972
Halton-Peel District Office (Oakville)	844-5747
Southeastern Region	
Kingston Regional Office	549-4000
Ottawa District Office	521-3450
Cornwall District Office	933-7402
Belleville District Office	962-9208
Pembroke District Office	732-3643
Northeastern Region	
Sudbury District Office	675-4501
Timmins District Office	268-3222
Sault Ste. Marie District Office	949-4640
North Bay District Office	476-1001
Parry Sound District Office	746-2139
Northwestern Region	
Thunder Bay District Office	475-1205
Kenora District Office	468-5578

APPENDIX VII-B.2

Tel. Nos. of Ontario Weather Offices*	Hours of Operation		Hub Respons.**
Toronto 676-4567 676-3020	24-hr. Operation (weather for all Ontario)		
Hamilton (T. Dwyer) 524-2035	Mon-Sat Sun OIC (Admin)	0545-2105 LST 0645-2205 0800-1530	Toronto
Kingston (G. Hasler) 613-389-3252	Mon-Sun	0545-2045 LST	Ottawa
London 451-4750	Mon-Sun	0545-2240 LST	Windsor
St. Catharines (R. King) 688-1847	Mon-Sun	0645-1715 LST	Toronto
North Bay (D. Code) 705-472-9110	24 hr. operation		-
Ottawa (M. Forbes) 185-8-9443 613-521-0850	24 hr. operation		-
Peterboro (R. Laroque) 519-542-6051	Mon-Sun	0630-1713 LST	Ottawa
Sarnia (G. Garner) 519-542-6051	Mon-Sun	0545-1630 LST	Windsor
S. Ste. Marie (R. Houghton) 705-779-3144	Mon-Sun	0630-2115 LST	North Bay

Tel. Nos. of Ontario Weather Offices*	Hours of Operation		Hub Respons.**
Sudbury (J. DeCorby) 705-693-4540	Mon-Sat	0545-2130 LST	Toronto
Waterloo/Well (J. Millar) 648-2571 648-2833	Mon-Fri Mon-Sun	0630-1400 LST 0630-1710 LST	Toronto (1PY)*** (2PY)***
Windsor (J. Mornan) 519-969-1792	24 hr. operation		

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* These are called WO 4 weather offices which provide briefing services and provision of documentation using weather forecasts from WO 1 levels. WO 1 levels provide the forecasts.

** During the quiet (or off) hours issuance of weather warnings would be taken over by the offices listed.

*** Persons on duty.

APPENDIX VII-C

DETAILS TO BE SHOWN ON CONTRACT DRAWINGS
PREPARED FOR THE MINISTRY OF THE ENVIRONMENT PROJECTS

The details which should be shown on all contract drawings are:

1. Plan and profile views with surface contours at intervals not greater than 5 feet or 2 metres (where possible).

2. All watercourses (permanent and intermittent) as well as major surface drainage courses.

3. In urban situations and rural residential areas, all trees and shrubs and landscape features and sensitive or unique areas within, as well as immediately outside, of the working area. The proponent or his agent should indicate the vegetation that is to be removed, as well as that which is to be saved, so that there will be no confusion in the field. In non-urban situations where larger forested areas exist and it is not practicable to identify each specific item of vegetation, general listings will be acceptable. However, special items or areas to be saved should be clearly marked.

4. All existing and planned (where known) utilities, occupied and vacant buildings, and other structures.

5. The alignment of pipelines and appurtenances and location of water/sewage works facilities, including boundaries of permanent and temporary easements, access roads; and construction yards, if applicable, are to be identified.

6. Notes and diagram details explaining methods of installation, restoration and/or removal of all permanent and temporary easements, access roads, bridges and any other facilities shall be included. Specific mitigation measures and designs of both a temporary and permanent nature to avoid environmental damage shall be included on a site specific basis where applicable; for example, details as to areas that are to be hydro-seeded, sodded, sodded and staked, rip-rapped, lined with Gabion baskets, etc. Items identifying requirements of landowners shall also be included, where applicable; for example, trench crossing access, fencing, vegetation protection, etc.

7. Location of snow fencing to be placed along the boundaries of the temporary easement.

8. Location of snow fencing around areas where the removal of vegetation is restricted until immediately before construction.

9. In sensitive areas the location of topsoil storage areas and/or typical cross sections of the easement, noting the location of topsoil and subsoil piles, are to be shown. Where the preservation of topsoil quality is an important issue topsoil storage areas should be positioned to minimize haulage distances.

10. Notes and location, where possible, of existing recreation areas potentially to be affected by the construction activity.

11. Any of the items referenced in these guidelines that the proponent or his agent might feel are pertinent to the instruction of the contractor and success of the project.

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